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STRATEGIC PETROLEUM RESERVE: REPROGRAMMING OF FUNDS

GOVERNMENT

Storage

HEARING BEFORE THE SUBCOMMITTEE ON ENERGY AND POWER OF THE COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE HOUSE OF REPRESENTATIVES

NINETY-FIFTH CONGRESS
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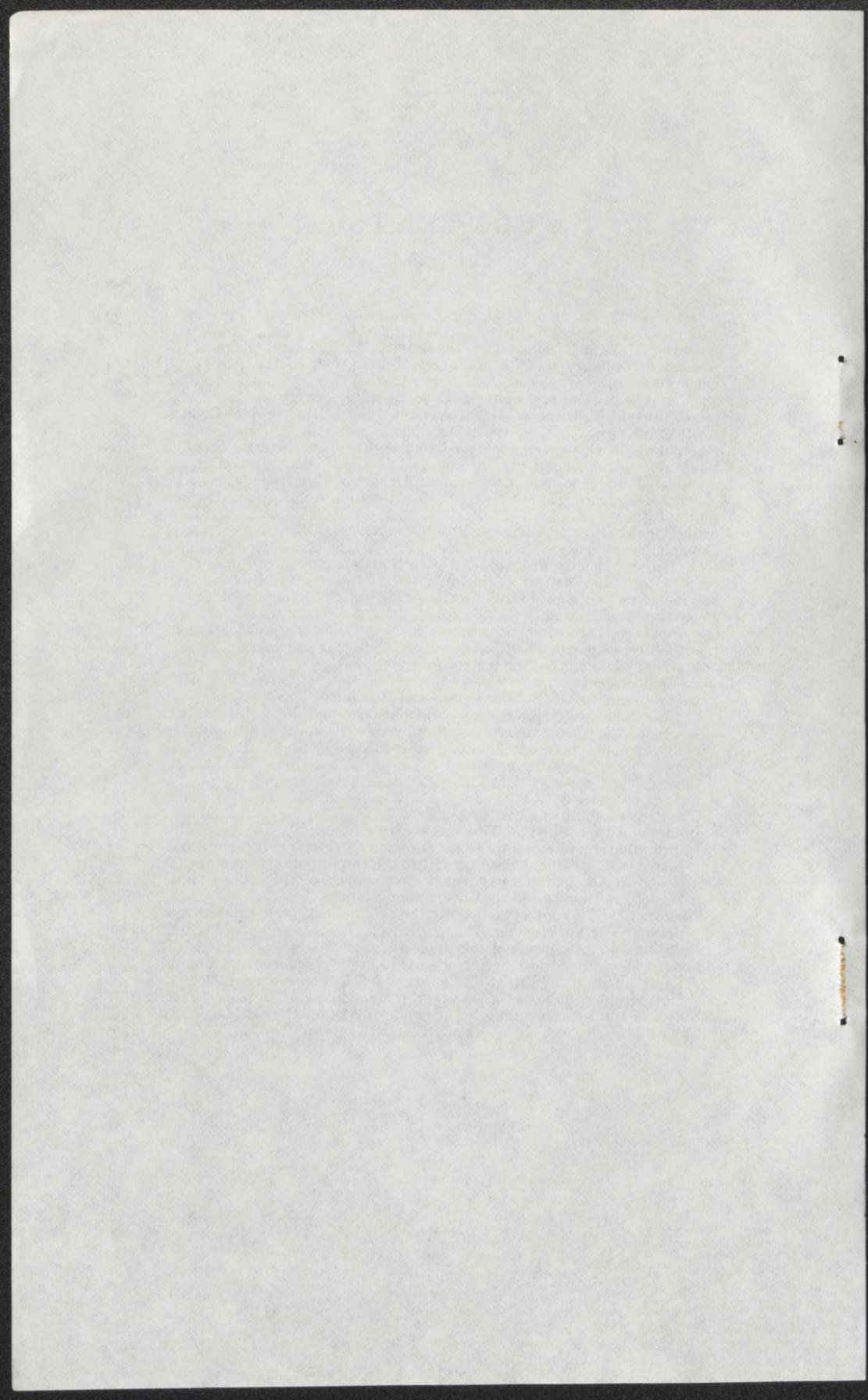
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STRATEGIC PETROLEUM RESERVE: REPROGRAMING OF FUNDS

MONDAY, DECEMBER 18, 1978

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON ENERGY AND POWER,
COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE
Washington, D.C.

The subcommittee met, pursuant to notice, at 10:30 a.m., in room 2123, Rayburn House Office Building, Hon. John D. Dingell (chairman) presiding.

Mr. DINGELL. The subcommittee will come to order.

The subject of today's hearing is the Strategic Petroleum Reserve. More particularly, the subject is the candor of the DOE officials in Washington who run the strategic petroleum reserve program and how they deal with Congress and particularly with this subcommittee.

The Arab oil embargo during the winter of 1973-74 and the resulting petroleum shortage caused severe impacts on the U.S. economy. It emphasized our vulnerability to interruptions in imports from the major oil exporting nations and to other supply disruptions. To minimize the impact of such events, another such embargo, the Energy Policy and Conservation Act (EPCA), signed into law on December 22, 1975, authorized the creation of a strategic petroleum reserve. Under this program, the Federal Government would buy oil and store it in specially constructed facilities so that on short notice the reserve oil could substitute for any embargoed supplies. This would give the Nation a cushion against future disruptions.

In May 1977, the subcommittee was told that the total cost of putting 500 million barrels in storage would be \$7.6 billion. In May 1978, the subcommittee was told this would be \$8.9 billion. With the information now being given to us, we see that this 500 million barrel objective is going to cost the taxpayers in excess of \$10 billion. In 6 months, the cost of the program has been inflated by a billion dollars.

Expressed in other terms, originally we were told it would cost \$1.53 to store a barrel of oil. Now, storing that same barrel is currently estimated to cost \$3.35 per barrel.

The Nation lives in a day of inflated costs, so I suppose we should expect some increases. What the members of this subcommittee are concerned about is the candor with which department officials take charge of the project. The subcommittee staff has been diligently asking all year long how the program was going. Everything was fine, costs were in line and fill schedule was on

target. Well, that is not the case, especially in the area of building the storage facilities. Construction cost increases have escalated clear out of sight.

In May of this year, Secretary Schlesinger advised Congress that the Department intended to double the size of the strategic petroleum reserve from 500 million barrels to 1 billion barrels. We were told the construction costs for the 500 million barrels would be \$835 million. This information confirmed the testimony Assistant Secretary McIsaac gave this subcommittee on March 13, 1978, in this very room. The subcommittee now finds that the cost is currently estimated at almost \$1.6 billion. In other words, in 6 months construction costs have nearly doubled.

However, in March, before Mr. McIsaac testified, DOE headquarters officials knew that the dollar figure they were quoting to the subcommittee as the cost to build storage for the first 500 million barrels would pay for only the first 250 million barrels. This was clearly shown in internal documents. In other words, the testimony given was not accurate and people in the Department had reason to know this. Furthermore, on April 3, 1978, Secretary Schlesinger sent to the Congress Energy Action No. 1, and on May 19 he sent us Energy Action No. 21. Both of those energy actions cited the \$835 million figure for construction costs.

The figures that were given to the Congress appear to be misleading for the Congress to base its decision on whether or not to double the size of the storage program.

At the same time we were being given misleading information with respect to the cost of the program, we were also being given misleading information on the schedule for filling the storage. When the program was set for 500 million barrels, the target for December 1978 was 125 million barrels in storage. When the use of the program was doubled this year, that 125 number was simply doubled and we were told that we would see 250 million barrels stored in the ground by December 1978. We now find out now that only about 68 million barrels will be in storage by the yearend.

The whole issue of cost overruns and delays in fill schedule raises a very serious and very fundamental point—the accuracy of information supplied to the subcommittee and its staff in its search for specifics.

The Chair wants to digress from the prepared statement. We are interested in supporting the Department. We are prepared to be understanding of errors and understanding where the information is made available to the subcommittee, but the Chair does feel that the subcommittee has a responsibility to our friends and colleagues in the Congress to see to it the facts and information are fairly and properly and truthfully laid out. The hearings today are addressed to that.

On November 3, I wrote to Secretary Schlesinger and pointed out the following: On September 14, a staff member of the subcommittee spoke with a senior program official responsible for details on costs and related information. He was told that although the construction phase of the program had incurred cost overruns, those costs would be met within the available appropriation for the fiscal year. Three weeks later, we were informed that the strategic petro-

leum reserve needed only a half billion dollars more merely to survive for the next 6 months.

Furthermore, in an October 4, letter, the DOE incorporated a clearly inaccurate attachment showing an anticipated cumulative fill of 114 billion barrels by the end of calendar year 1978. That number was, in fact, higher than the actual fill that the Department of Energy anticipated.

Just last month, this billion-barrel storage program was priced at \$22.5 billion for completion by 1985. Now, the subcommittee has seen internal DOE documents that estimate it will cost \$25 billion. In 1 month, the Chair observes according to the DOE's papers, estimated costs have increased \$2.5 billion. To make matters worse, everyone admits this \$25 billion figure is very soft. We know the out-year costs are phenomenal. In view of the serious questions we have about the costs in the next year, it is highly unlikely that the subcommittee can have any confidence in these total cost projections. It is more likely that a year from now the \$25 billion cost will be closer to \$30 billion.

Again the Chair wishes to observe that we simply want to know what the facts are so that we can report to the Congress and so that the committee can conduct its proper responsibility in overseeing the expenditure of public moneys. If there are problems, the subcommittee is prepared to be both understanding and helpful. The Chair does observe that the subcommittee is very reluctant to let programs under the jurisdiction of this subcommittee either be improperly administered or to be based upon bad cost estimates, so that the Congress is misled as to the conduct of these programs.

I do not want my remarks today to reflect badly upon the Department of Energy people who are working with the strategic reserve program in the field. Subcommittee staff members have been to the field. They have found the field people were overworked and understaffed. Given the limited resources that headquarters has provided, these people have done well to bring the program as far along as it is. Clearly, the failures in the strategic petroleum reserve program are management failures. They reflect a failure by the agency to address the problems realistically, to provide adequate resources to the field, and to advise the Congress fairly and adequately.

Now that the costs of the program have skyrocketed and the program is delayed, the solution of the agency to its problems is to shift responsibilities. Despite the fact that they are the only people with actual experience in constructing storage facilities, the Department now wants to put all that experience on the shelf. Through a proposed new approach—turnkey—private industry will be given the opportunity to repeat the mistakes made by the Government heretofore. Then next year, when the program is still bedeviled and Congress demands answers from the Department, they can point to private industry and say they are the ones to blame. I am not convinced that this share the blame proposal really serves the public well. The decision to contract out responsibility was made without cost alternatives being presented. Whether we continue building the strategic petroleum reserve the way we have been or whether we adopt the turnkey proposal, there are still a lot of unknowns. The Government—and therefore the tax-

payer—will still pay for these unknowns. The turnkey proposal sounds exactly like “total package procurement.” That was something the Department of Defense promoted a few years ago with disastrous results.

Our first witness this morning is very familiar with total package procurement.

The Chair observes that our first witness is Mr. A. Ernest Fitzgerald, Deputy for Productivity Management, Office of the Assistant Secretary of the Air Force. Mr. Fitzgerald is here as a result of a special request of the Chair to inquire into the handling of this particular matter in view of his expertise as regards the conduct of procurement programs by the Department of Defense.

Mr. Fitzgerald, we are pleased you are with us. If you will come forward to the witness stand and identify yourself, we will be happy to receive your testimony.

STATEMENT OF A. ERNEST FITZGERALD, DEPUTY FOR PRODUCTIVITY MANAGEMENT, OFFICE OF THE ASSISTANT SECRETARY OF THE AIR FORCE, DEPARTMENT OF THE AIR FORCE, DEPARTMENT OF DEFENSE

Mr. FITZGERALD. Thank you, Mr. Chairman. I am the Deputy for Productivity Management in the Air Force, and, as the chairman mentioned, he requested my assistance through the Secretary of the Air Force Office. I had actually less than 1 week to prepare for this testimony and I had hoped that the Department of Energy would furnish the subcommittee with sufficient factual information to permit an evaluation of the effectiveness of the procurement approach being followed in the strategic reserve program.

Despite the best efforts though of the subcommittee staff, very little hard information on the effectiveness of the SPR procurement was obtained. I sat in on a number of sessions with the staff and with DOE officials and I saw firsthand the efforts that the subcommittee staff made to get factual information.

Either the Department of Energy lacks the most rudimentary procurement documentation or was giving us something of a run-around in the request for information. I suggest, in any event, that the subcommittee staff persist in their efforts to obtain the information that was requested.

In spite of the lack of substantive data, I should like to comment on the general procurement and program management strategies and to suggest approaches which I believe would improve oversight of the strategic reserve program.

As a result of discussions with your staff and with DOE officials, it is clear to me that the Department of Energy did not make full and timely disclosure to your subcommittee of the very serious cost growth, as it developed. Based on conferences with DOE officials, it appears that as early as February or March of 1978 the New Orleans office at least knew the construction program would suffer enormous cost growth based on numbers that they gave us. They seemed to think that the program unit costs would escalate to the neighborhood of \$3.24 a barrel at that time. This was the so-called lying-in-the-sand estimate that was prepared in the New Orleans office.

Given the reluctance of the top DOE officials to give forthright answers to the substantive questions of the past week, I can only conclude that the failure to make full and timely disclosure was part of an all-too-general strategic pattern on major Government programs. As a result of my long experience in this field, I have concluded that bureaucratically successful managers of giant programs seek to divide their program into two phases for presentation to the Congress and the public. Those two phases: too early to tell and too late to stop, with never a little window in which it is just right to take corrective action.

The DOE officials we questioned yesterday during the past week made great efforts to convince us it was really too early to tell where the total program stood. That may be true, but in the meantime the subcommittee staff gave me documents which pointed to the Department of Energy's intentions which could quickly obligate the Government to such an extent that the program advocates could immediately begin to picture the strategic petroleum reserve program as being in the too-late-to-stop phase.

For example, in the document dated November 22d entitled "Strategic Petroleum Reserve, Fiscal Year 1979 Reprogramming Request and Fiscal Year 1980 Budget Submission," the Department of Energy depicts a reprogramming request of \$1,476,129,000 for fiscal year 1979 alone. Remember, this is on a basic appropriation of about \$103 million, a 1,400-percent increase for fiscal year 1979 alone. When added to the existing available obligational authority counting the carryover of previous years of \$228 million already appropriated, the DOD could, under this plan, obligate the Government for \$1.704 billion during fiscal year 1979 for storage facilities development alone.

Obviously after such an enormous obligation it would be much easier to program advocates to make the so-called sub cost arguments, that is, the too-late-to-stop argument, to justify the continuation of the program as is.

If this proposed coup could be pulled off, the Congress and the taxpayers could be confronted with a giant program justified on the basis of national defense in part that could both undefined, that is, too early to tell and too far along to stop. I think this has all the ingredients of being a giant fiscal disaster rivaling some of these we have in the Pentagon if it continues to progress in the manner of the past year.

DOE officials could not describe to us how they arrived at what the storage facilities development program should cost, how they kept track of the individual status of the total contracts in the program, how they maintained records of sequential re-estimates, or how they restrained cost growth.

Based on discussions with Department of Energy officials, it appears that they are banking heavily on the new procurement approach called "turnkey" to bring order to the program. On examination, as the chairman has indicated in his opening statement, the turnkey approach appeared similar to the so-called total package procurement which was employed in acquiring the C-5A transport airplane. Given the fact that the C-5A turned out to be one of the most notorious procurement disasters for the taxpayers in recent years, one might hope that the Department of Energy offi-

cials, many of whom have firsthand knowledge of the C-5A and other Pentagon procurement disasters, would readopt the total package procurement only after very thorough and careful study. However, we were told by DOE officials that the total package or turnkey approach was selected from three alternatives without even the benefit of cost estimates for the three approaches.

Moreover, one high DOE official conceded that not only was cost not a consideration in selection of the turnkey alternative, but also that the turnkey approach would reduce the Government's visibility and ability to control events and that the Government would have to share the risk with the contractors.

We might ask ourselves then, what is the attraction of turnkey? One Department of Energy official more forthcoming than most that we talked to told us straightforwardly he was simply tired of being criticized for mismanagement. This official and others also told us that restrictions on number of in-house personnel were a factor, and I must say that this explanation is a common one for similar actions in other areas of Government management.

The proposition was stated most successfully in the minutes of a meeting held last year in one of our Air Force commands where we had experienced severe difficulties in developing computerized management information systems. I will quote with just slight bowdlerization to protect the individuals from this document.

"We have contract money but we do not have money to pay for more programmers in-house. Let's miniaturize the impacts on our system and maximize the impacts on the contractors' programs. Then if we have to slip because the contractor is not ready, the command's hands are clean."

Even though I am completely unsympathetic with the attitude expressed in this quote, I understand completely the bureaucratic and political appeal of such an approach. The organization can announce with fanfare that they have held the line or even cut back on in-house bureaucrats. In the present climate most Government organizations dealing with large industrial contracts assume, and I believe rightly so, that they can get money almost without limit for contracting out work which might be done in-house, including management.

Probably most important of all, the contracting out approach, particularly of the nature that has been described to us, would add very powerful and influential new members to the program advocate team. Obviously it is much easier to keep money flowing to a major program if Government managers can call upon giant business firms and, if necessary, their bankers, for public relations and lobbying help. The concentrated self-interest generated by one huge contract with one or a small number of contractors is obviously much greater than that generated by a multitude of diffused smaller contracts. It is also important to recognize that contracting out has great appeal for overall constituency building and budget justification.

If there is no objection, I would like to insert in the record a chart from a report privately distributed that was prepared by Dr. S. M. Silverman of the Air Force.

[The chart referred to was retained in the subcommittee files.]

Mr. FITZGERALD. This chart shows that organizations winning the large increase in their total research and development budget over a recent time span of 2 years, 1974 to 1976, also had the largest percentage of their increase going to industry. This lesson, of course, is not lost on the managers of our Government organizations.

The apparent willingness to allow huge increases in total unit costs of necessary goods and services while loudly proclaiming savings, so-called, of reduced in-house manpower is probably the most costly management practice now current in our Government. The report of the Air Force Worldwide Productivity Conference held in October of 1978 described the practice as a serious demotivating factor. I will read you the direct quote and then try to translate it for you from bureaucratese into English. The quote, citing the demotivating factor:

Rules and manpower budget constraints that require contracting of work that might otherwise be done in-house. In some instances the cost of contracting out significantly exceeds the in-house cost. At the same time the contractor's qualitative performance may be judged inferior to that available in-house. In these instances the anomaly is not lost to the perception of Air Force employees. The resultant impact is demotivating to our employees and reduces the opportunities for managers to convince employees that the Air Force is genuinely dedicated to productivity enhancement.

Translated from the bureaucratese, this means that nobody believes top management is serious about cost reduction or cost control as long as we appear willing to open the money sack at both ends for big contractors. You simply cannot convince the people who are doing the work on the firing line otherwise, unless you are evenhanded and tough across the board.

I do not mean to imply here that we should not make judicious use of contractors' knowledge or that total package procurement is always bad. However, in any contracting effort I think we should as a minimum be able to define exactly what we are buying and we should have a reasonable assurance that contracts are entered into at the lowest sound price, that growth of the contract can be constrained by the Government, and, most important of all, we must be willing to enforce contracts even if it means letting giant firms go broke.

Unfortunately, the Government has not demonstrated a willingness to inflict real hardship on failing giant firms. The most recent example of that is shipbuilders. It bailed out at a cost of hundreds of millions of dollars, not through any demonstrated legal expansion of the scope of work but rather through the use of Public Law 85-804, the bailout law, transactions under which are described legally as amendments without consideration, which means exactly what you think it means. My understanding is that this relief is also available to the Department of Energy. I may be wrong on that. I know it was available to 11 executive agencies before the creation of the Department of Energy, and one of them was the atomic energy operation.

Contracting out management also greatly reduces the ability of the Government management team to question, to carry on effective negotiations, and to manage effectively future programs. The Government should manage at least enough programs at the detail

level to gain a yardstick for themselves to know how contracted-out effort is doing.

I will give you one example from my own experience. When I was a consultant with the Navy, we had an in-house operation that made torpedoes. It was a perfectly dreadful operation. It was just at horribly high cost, we thought. But we could tell immediately when the contractors were in trouble, when they got worse than our in-house operation, so the use of a yardstick is very valuable. When the Navy lost that yardstick, we had escalation of orders of magnitude like 10 times in the cost of torpedoes.

But I will stop here with my general observations and I am willing to answer any questions that the subcommittee might have.

Mr. DINGELL. Mr. Fitzgerald, the committee observes that you have assisted the staff in their inquiries into this matter and that you are here by the specific request of the committee. We do thank you for your appearance.

The Chair now recognizes my colleagues. The Chair will recognize first in order of appearance Mr. Gore, Mr. Wirth, and then Mr. Sharp.

Mr. GORE. Thank you, Mr. Chairman. Mr. Fitzgerald, in addition to your very competent and continuing work you have become a symbol of the kind of approach to Government spending that the American people have made quite clear that they would like applied to all programs and all endeavors of the Federal Government. I would like to echo the sentiments of the chairman in thanking you for your assistance in this subcommittee's approach.

I take it the bottom line of your testimony, if I can draw bottom line out of it, is that the turnkey approach to the additional site preparation for the storage program is, in your opinion, invisible?

Mr. FITZGERALD. Certainly based on what we have been told. I must qualify everything I say by pointing out again that I only got involved in this last Tuesday. But based on the lack of information given to us, it would certainly appear that they are not ready to contract. I know many of the individuals who are involved in this and have known some of them for many years. Some of the people down at New Orleans I think are just excellent people. I sense from talking to them that they are just really beginning to get their feet on the ground in understanding how to manage these projects.

I think, very honestly, that the program would benefit greatly from a pause to sort of regroup and assess where they are, and then move out with a certainty of where they are going, how far they should go, and what the things they are buying ought to cost. We heard some real horror stories of letting construction contracts before the designs were complete, which always costs us more money and take more time. These things are done in the name of saving time, and we have a saying in the Pentagon that we always have time to do things twice but we do not have time to do them once right. That is what we end up doing.

I sincerely believe that the program would benefit from a thorough reassessment and a pause.

Mr. GORE. The experience of this subcommittee tends to confirm your assessment of the capabilities of those people in the field who are actually grappling with the problems of the storage program,

and that the real problem is probably management within the higher levels of the Department of Energy.

You are telling us that the reasons for adopting the turnkey approach—and I believe that a later witness refers to it as some kind of package approach, are often bureaucratic, politically motivated rather than any desire for efficiency, and that we ought to be very wary of this reprogramming initially. Second, you are saying that the decision to hand everything over to a contractor, is to let the management of the DOE wash their hands of the responsibility for overruns so that they can then hold down their personnel ceilings and budget levels and blame future increases on the contractor.

Mr. FITZGERALD. I am certain that no one from DOE would tell you that they are not interested in getting greater efficiency, and certainly they would all deny they are in any way thinking of contracting out their basic responsibilities. But the fact is, on the basis of history, that is what has happened. That is my point to you. I think it is important to recognize that although the taxpayers and some of the people who fly the airplanes may view such programs as the C-5A as procurement disasters, they are not necessarily viewed that way inside the bureaucracy.

During the recent shipbuilding bailouts, the Air Force people that helped bail out Lockheed on the C-5A through application of Public Law 85-804—not the loan guarantee; the 85-804 thing was quite different—were consulted by the Navy in how to do it again. They were considered very successful. No one got fired except me, of course. The folks who participated in concealing from the Congress the dreadful state of the program all seem to have prospered. Lockheed lost a little money because of the belated disclosures, and Senator Proxmire and other people's opposition, but even that was much less than they would have lost otherwise, so they do not necessarily view it inside the bureaucracy at the top levels the same way the Congress and the taxpayers do.

Mr. GORE. Can you identify other salient examples of this approach?

Mr. FITZGERALD. Of the total package approach?

Mr. GORE. Yes.

Mr. FITZGERALD. Yes. The Mark 48 torpedo is one I am quite familiar with. It was a variation on this theme. As in the case of the C-5A contract, contracts were written which could have been enforced, but they are not enforced because of the unwillingness of the Government to cause giant firms to lose money, perhaps even to go bankrupt. Once it is understood that you are unwilling to enforce the contract, you do not really have a contract. The lid is off, particularly when you couple it with the national security justification, which I am not questioning. But any time the Government and the taxpayers demonstrate that they are willing to pay any price for any kind of goods and services, somebody is going to charge them any price. There has to be some restraint on it. The total package approach has not in the past provided that restraint.

Mr. GORE. The national security implications of this program were underscored by the news over the weekend. Once again I would like to thank you for assisting us in our efforts to nip this in the bud before it becomes the C-5A of the Department of Energy.

Mr. FITZGERALD. Thank you, sir.

Mr. DINGELL. The Chair thanks the gentleman. The Chair recognizes the gentleman to my far right.

Mr. WIRTH. Thank you.

I want to echo Mr. Gore's comments. Thank you very much for being here. I would like to ask you a couple very quick questions here.

First of all, on the experience that we have had in the Government, and I suppose particularly in the Pentagon on turnkey programs, the Department of Energy is suggesting that the storage program be turnkeyed with major companies, and it seems to me there are some major themes in that that must be familiar to you in terms of building safeguards into the program.

Have you talked to the people in the Department of Energy about the experience in developing safeguards so that we do not get ourselves into a situation in which we contract on a turnkey basis at a certain cost, say \$3 a barrel, or whatever the number would appear to be, and then 4 years from now the cost comes in at \$5 a barrel? What do we do about that kind of overrun situation?

Can you build into a contract the understanding the contractor is going to be backed over if that occurs, to develop a kind of discipline within the contract so that you do not have that sort of overrun, or is this the classic kind of problem with any kind of contracting like that? Can you comment on that?

Mr. FITZGERALD. Yes, sir, I think it is possible to write a contract, a firm fixed-price contract for construction or anything else that can be enforced. As I say, you must know what you are doing in order to write such a contract. And we were told by Department of Energy officials that they were going to write a so-called performance contract that would make it easier to enforce. This was the kind of contract that we had on the C-5A. It was a performance contract. The basic problem in addition to knowing what you are buying and being able to specify in legally enforceable terms is the willingness to hold them to it. I do not know how you can prejudge that except to look at the experience of the willingness of the Department of Energy to enforce other contracts.

I asked the procurement officials in New Orleans how many contractors had lost money as a result of the enormous increases already experienced, and they could think of only one sizable loss in the neighborhood of \$2 or \$3 million. They may think of others in the future. But it appears to me that the record of the whole government in getting tough with big business firms is very poor.

I read the paper about the subcommittee's disclosures on other aspects of Department of Energy problems, and it is not encouraging. I do not know that it is any different from other parts of the Government, but I think from the subcommittee's standpoint if you could have some sort of alternatives in mind and you could have cut off points, there has to be some point at which we can't afford it. And if you can identify that ahead of time, the point at which other priorities become more important even to the national security and let that be known to the operators and defenders of the program that you are far ahead, if they know that there is a limit on the program, and if they are austere funded—in other words, if they are sort of poverty stricken, their stewardship tends to be

much better. But you have to have an alternative. If you let it be known that you have no alternative and that even a pause due to termination for default would be unbearable, there is no way you can enforce the contract.

Mr. WIRTH. It seems to me that again gets into our next witnesses and your statement earlier of go slow and do the job right the first time around. If you start to look at the economics of \$15 a barrel or \$4 for storage over a considerable period of time you are getting into extraordinarily high figures for the cost per barrel, at which point a lot of other alternatives—if that is what you mean by alternatives—become much more attractive than the prospects of going about storing oil 7 years down the line at a phenomenal amount. Is that what you mean by alternatives?

Mr. FITZGERALD. Yes, that is one set of alternatives. Obviously there are alternate methods of storing oil. For many, many years we had the naval reserves which we had in the ground. I understood you cannot draw it out fast enough necessarily, but it was an obvious solution to part of the problem.

Mr. WIRTH. Looking to turnkey contracts and developing the safeguards we have been talking about, is there a repository of experience that exists at the GAO or exists within various contract histories that the subcommittee can know about if DOE moves in this direction we are sure you do not get into the second alternative you are talking about, you are so far down the road you don't have any alternatives, you have to keep pouring money down that sump hole?

Mr. FITZGERALD. Yes, sir, I believe there are. In addition to the ones I have mentioned, we had a tremendous amount of experience in Vietnam in Southeast Asia in construction as such. I was involved in a so-called turnkey operation. I was watching construction of an airbase on the coast of South Vietnam. This was one that turned out better than most in terms of the total dollars, but in that one we, as I recall, were able to restrain the cost growth only by cutting back the scope of the program. This is one of the things I was referring to when I said have cutoff points and things you can drop out.

We were able to drop out things that were not vital to the program and keep the costs within fairly respectable bounds of that area of cost growth, which was disastrous overall. But, yes, sir, to answer your question, we have lots of examples.

Mr. WIRTH. Thank you, sir. Thank you, Mr. Chairman.

I would hope when DOE comes up we can ask them what kind of plans they have if they go ahead with the turnkey project of building in the sort of experience that we have just heard from our first witness this morning.

Mr. DINGELL. The Chair recognizes now our good friend Mr. Sharp.

Mr. SHARP. Thank you, Mr. Chairman.

Mr. Fitzgerald, I wondered if you could spell out for us a little more specifically what steps you think the Department should be taking now in order to review where they are and hopefully make a better decision; and in conjunction with that, what questions specifically ought we be asking in order to help keep them on the ball.

Mr. FITZGERALD. Well, procedurally, let me pick up some procedural things that I sort of glossed over.

I think, first of all, the subcommittee and everyone else managing the program should get timely and accurate facts, such as the fact that we were told we were stable last February and March on the reestimates. In other words, you need a good baseline of what it is estimated that the program is likely to cost, the so-called well-cost figure which is fielded for funding.

In addition, I think that the program managers and you need to know what the program and the individual contracts should cost, which may be very different from what they will cost, the difference being inefficiency, which we should seek to avoid or minimize once it starts.

There should be a systematic track from one estimate to another, and I am certain General DeLuca is going to do that, because this is standard boilerplate practice within the Air Force.

We need meaningful status reports, where we stand today on each contract and the total program, whether they are overrun or underrun on work done so far. In that case, for that bit of information, the Department of Defense approach will not be adequate, but people know how to do that.

We need up-to-date forecasts of estimates of completion, which should not be confused with the current status of overruns and underruns; so for much it is a different thing, although they may incorporate the current status information.

I think those are the basic kind of procedural information bits you should have. This is with the exception of the should-cost and some of the status information. This is available in the Pentagon. The most disastrous of the programs have that.

It is important, though, to understand that the reports, documents and all that don't really control costs, you know. You have to have the motivation to do so and the will do to so.

I again come back to the austere funding, determining orderly cutoff or cutback points, and being prepared to terminate, have an alternative that you can go to. If you don't have that, I think it is very difficult to restrain it.

Mr. SHARP. I am not sure how helpful that is.

Mr. FITZGERALD. I can be as specific as you like on the documentation required.

Mr. SHARP. Your general impression is, they don't have an adequate data base and the information available to make the decisions to begin with; is that right?

Mr. FITZGERALD. Yes, sir, if what we were told is accurate. I only know what we were told. We got very little in the way of specifics during my work with the subcommittee staff in attempting to assess the effectiveness of the program.

The key officials in the program understand what is needed; I am convinced of that.

Mr. SHARP. When you say the key officials in the program, are you talking about here in the Department or people who are in the field, in Louisiana or where?

Mr. FITZGERALD. Specifically in the New Orleans office.

Mr. SHARP. Those are the people directly supervising and in charge?

Mr. FITZGERALD. Yes, sir.

Mr. SHARP. If they were to go to a turnkey operation, what happens to those people?

Mr. FITZGERALD. Well, I presume they would stay there. I think if the turnkey follows the pattern of other turnkey or total-package operations, they would be one more step removed from the actual operations and therefore would tend to lose their expertise to some extent, and would lose their ability to some extent to question, to challenge, be more effective in negotiations.

Mr. SHARP. So it is your impression that those people who, I guess, engage in negotiations for the subcontracts and things at the present time, are up to that task, and the problem does not lie in the personnel who have to carry out the day-to-day, ongoing operations?

Mr. FITZGERALD. I don't know that they are up to the peak in terms of staffing. I know some of their top people, whom I think very highly of; I have known them personally and professionally for some years. I am not in a position to say whether or not they have enough people. They claim they do not. I can't say, but I do think they have the ability to do better than has been displayed.

Mr. DINGELL. Would the gentleman yield?

Mr. SHARP. Surely.

Mr. DINGELL. Did you, in your inquiries into this matter, Mr. Fitzgerald, find that the Department of Energy had in place procedures to carry out the contract controls that you have described to us?

Mr. FITZGERALD. No, sir; I did not find that. That does not mean they are not there.

I must say, in all candor, I had the feeling they were holding out on us to some extent. No, sir; they did not display those to us.

Mr. DINGELL. They did not?

Mr. FITZGERALD. No, sir.

Mr. DINGELL. Is this something that is set out in a manual or in a set of procedures that are followed by the agency?

Mr. FITZGERALD. I don't know. As I said, the basic boilerplate kind are the kind that are set out in procedures of the Department of Defense where many of these people come from.

Mr. DINGELL. You do have such procedures in written form in the Department of Defense?

Mr. FITZGERALD. Yes, some are imperfect, but the basic cost-tracking procedures, for example, are a formal procedure within the Air Force and the Department of Defense, contract fund status reports, which don't really do much to control costs but tell you where you are, or a formal procedure.

Performance measurement approaches are formal Department of Defense directives and Air Force regulations. Those are imperfect but they are in place and are better than nothing.

Mr. DINGELL. Did you inquire whether such procedures were in written form?

Mr. FITZGERALD. Yes, sir.

Mr. DINGELL. What were your findings?

Mr. FITZGERALD. I was given a specific answer only on the cost tracking and I was told they did not have the cost-tracking proce-

dures that both I and some people in the Department of Energy were familiar with.

Mr. DINGELL. Did you inquire as to other procedures?

Mr. FITZGERALD. Yes, sir.

Mr. DINGELL. What were you advised as regards these other procedures?

Mr. FITZGERALD. I specifically asked and queried several individuals about the methods and the approaches that they used in cost estimating—you know, how they estimated what the contracts should cost and how much they were likely to cost. I didn't get a satisfactory answer from anyone on those, and particularly on the total package or turnkey approach we were told they had not even made an estimate, as I indicated in reading my notes. They apparently had made the decision to go to that approach without benefit of cost estimates.

Mr. DINGELL. Thank you.

Mr. SHARP. I have been told by Department officials that the history of this thing has changed fairly substantially, the implication being it is much improved now. This is prior to actually going to the turnkey, obviously, which they haven't yet done but are in the process of trying to do.

Have you had a chance to examine the history of this? In other words, it was never set up very well under the old FEA and it has only been in the last 4, 5 or 6 months the thing has undergone, in a sense, management reorganization and the priority in the Department it deserves, and those kinds of things that may lead us to believe that in fact we are at a level of better performance now than what was. Is there any hope for that, or are you suggesting to us it has a long way to go?

Mr. FITZGERALD. Not having seen it before, I couldn't say or couldn't give you a comparison; however, the impression that was conveyed to me by the New Orleans people essentially was what you told me, that they are just reaching a stage of expertise and readiness that they think they could do a good management job, given the opportunity.

That is why I am wondering if it is wise to go with the total package at that point. I would not be in a position to make any comparison at all of before and after; I don't know.

I do know they told us they, for the first time, apparently, made a realistic assessment of what the financial requirements would be in February or March of this year, but apparently did not convey this assessment to the subcommittee.

Mr. SHARP. Am I wrong, also, that, for example, you used the figure of \$3.24 a barrel as the now cost and the original estimate was \$1.50? But is it not true that the difference is a matter of what you count in the cost, and that originally they didn't count things like the lines going in and what not?

Mr. FITZGERALD. Counting what going in?

Mr. SHARP. What would be counted in that cost per barrel that is now figured at \$3.24. You gave us that figure, I believe. The suggestion is that it has dramatically risen, but the original estimates did not include the same aspects of the cost; in other words, they didn't include the lines, for example, going in or out of the caverns. I am not certain about that, but I understand this may go back to your

procedural problem, that what we were talking about 2 years ago is not the same thing we are talking about now, because the basic data are organized differently?

Mr. FITZGERALD. I was told some of the preliminary designs left out major parts of the construction job. I don't know that.

Yes, I was told that. The \$3.24 figure I gave you is not the official figure that appears now. I believe the latest official figure is \$3.35; \$3.24 is what the new team in New Orleans said they came up with last February or March, after simply adding up what they thought they were already buying.

Certainly, improper and incomplete definition of what the program consists of is always a problem. It is an even greater problem if you go into a long-term, total package contract without fully defining what you are buying.

Mr. SHARP. Let me get back down to what I think you made very clear: I guess you are recommending that this subcommittee ought to be concerned about having an absolutely thorough review before making a decision to go to turnkey, whether that is cost effective and the wisest way to manage, and see if there isn't another alternative, just using the existing operation. Is that what you are telling us we ought to do now, don't make a decision on turnkey—I mean, don't come to a final conclusion right now, but get the facts together and review this thing thoroughly?

Mr. FITZGERALD. Yes, sir. Based on my very limited review, I could not get in my own mind enough information that I would feel confident to make a decision on it.

Mr. GORE [presiding]. In response to one of Mr. Sharp's questions, you said you could provide the necessary detailed documentation to allow us to design a tracking system, what we ought to be looking for to keep track of a program like this.

The Chair would like to formally request that you provide that to the subcommittee, if that is possible.

Mr. FITZGERALD. Yes, sir; it will take a little while to pull it together, but I will be glad to do that.

Mr. GORE. Thank you very much.

[The requested material was subsequently supplied to the subcommittee and was retained in the files.]

Mr. GORE. I recognize you now, counsel.

Mr. BARRETT. Could you comment about specifically the type of oil the petroleum reserve seems to be buying?

Mr. FITZGERALD. I asked questions of some of the individuals in the Department of Energy as to why they were buying the so-called sour crude, high sulfur and low percentage of the middle distillates, and I didn't get an answer. I don't know why they are doing that. That was in the line of general questioning about the sizing of the program, what they were storing and so on.

I would strongly urge you to look into that and consult someone more expert than I as to the possible use of that type of crude.

Mr. BARRETT. Is it your understanding that middle distillate is more desirable in terms of home heating oil than gasoline?

Mr. FITZGERALD. Generally speaking, that is the fraction you want to the crude, the gasoline, kerosene, the home heating oil, and that kind of thing, a minimum of sludge and sulfur.

Mr. BARRETT. Did you hear about a red book?

Mr. FITZGERALD. Yes, sir. I was told there was what I presumed to be a special report, or a recurring management report, called the red book, into which the estimates that were made last February and March were put. I was unable to get a copy of the red book, whatever that is.

Mr. BARRETT. This red book figure, is it your understanding there was an estimate of \$810 million for the first 250 million barrels?

Mr. FITZGERALD. In attempting to put together a cost track for myself, I asked that question of the people at New Orleans, and I got that as the second item in their cost track. The old estimate before that time they told me was \$776 million for 500 million barrels, and then that was up until February or March, and the March estimate was \$810 million for 250 million barrels, which I figured to be something over \$3 a barrel. That was adjusted in May or June to \$840 million for the same 250 million barrels.

They do have, even though not in formal fashion, a kind of a track of the cost estimates, which would have been helpful to your subcommittee, and still would.

Mr. GORE. How early in May did they have these figures?

Mr. FITZGERALD. I was told they had them in February or March. They weren't sure exactly when they were completed.

Mr. GORE. And yet some months after that they came and testified to this subcommittee that the figures were essentially half that, or that the same figure would buy twice the amount of storage?

Mr. FITZGERALD. I haven't read the testimony, but I understand from talking to the staff that the staff obtained the information basically in a field trip to New Orleans in early November.

Mr. GORE. I would like to touch briefly on a question the counsel asked, to tie this down for the DOE people coming up.

What percentage of the oil being purchased is sour?

Mr. FITZGERALD. I don't recall that.

Mr. GORE. Over half?

Mr. FITZGERALD. I seem to remember it was around half or over, but that was not what I was looking at specifically. I was trying to just get a general feel for the background of the program, so I don't really recall the exact percentage, but it is quite a large amount.

Mr. GORE. Part of the justification given, and still given, for concentrating on acquisition early is that the price is expected to rise.

I note in the reports from the OPEC meeting that perhaps the real sleeper in the OPEC decision is to impose a premium on light crude. It seems we have been buying less of that and more of the sour crude. There is no shortage of asphalt in the country. That would be the only reason for concentrating on the sour crude, would it not?

Mr. FITZGERALD. I don't really know. I am puzzled by it. As I say, it was of secondary consideration to me, and I think I raised a question when I saw it. I must confess, I didn't pursue that as vigorously as I did the other questions I had on efficiency, productivity, and procurement. I was trying to get enough information together to testify.

Mr. GORE. The sour crude is more difficult to refine; is that correct?

Mr. FITZGERALD. I am not certain that refiners would say it is more difficult to refine; it can be distilled like anything else.

Mr. GORE. I guess, given the refinery that you plan to use, it might or might not make a significant difference.

Did you find plans in place specifying which refineries are going to be used?

Mr. FITZGERALD. No, sir, I didn't inquire into that.

Mr. GORE. Did you find any plans for marketing, for the user marketing of the oil?

Mr. FITZGERALD. No, sir; I didn't inquire into that either. I simply didn't have time to pursue that in the three days that I had.

Mr. DINGELL. One final, general question:

In your experience with these kinds of programs—and I guess this is a leading question, but I will ask it anyway—do you think it is a good practice to start on construction before design has been completed?

Mr. FITZGERALD. Absolutely not. As I said, in the Pentagon we have a saying that we don't have time to do it right, but we have time to do it twice. I simply don't think that saves you time. It is usually done in the name of necessity to save time and ends up not saving time.

Mr. DINGELL. Did the DOE people tell you in fact they had done precisely this, started on construction before completing design?

Mr. FITZGERALD. Yes, sir; they told us they had done that.

Mr. DINGELL. The Chair recognizes Mr. Moore.

Mr. MOORE. Thank you, Mr. Chairman.

I came in late and received a briefing on what you testified. I would ask this basic question: What is your official connection with this strategic petroleum reserve program?

Mr. GORE. If I may interrupt—at the outset the chairman made clear he was participating at the specific request of the subcommittee, the request being made to the Department of the Air Force, and he is looking at it at the request of this subcommittee.

Mr. FITZGERALD. My specific authority was the copy of the letter from the chairman, along with the Secretary of the Air Force's answer, which was sent to me, giving me permission to assist the subcommittee. I am an employee of the Air Force. I have no management responsibility in any way in the Department of Energy.

Mr. MOORE. How long have you been associated with, and have you studied or looked at this strategic program?

Mr. FITZGERALD. Since last Tuesday.

Mr. MOORE. Every day since last Tuesday?

Mr. FITZGERALD. Yes, sir.

Mr. MOORE. Saturday and Sunday?

Mr. FITZGERALD. Yes, sir, all day Saturday and all day Sunday.

Mr. MOORE. What is your opinion as to the experience or competency, if they are the same, of DOE's ability to put together the strategic petroleum reserve program. Do they have the competency and experience for drilling into salt domes, knowing who to hire to do that and being an owner, as, let's say, an industrial

company has done many times, like there are many in Louisiana could do it who have much experience.

In your studies since last Tuesday, do they have this experience or ability or not?

Mr. FITZGERALD. The individuals I know in the New Orleans office do not have specific experience in drilling into and leaching salt domes; however, they are highly experienced Government program managers, having dealt with a wide range of things. In one case the guy has actually saved money from time to time, which, I think, is almost unique.

Mr. MOORE. The Hackberry explosion saved somebody money?

Mr. FITZGERALD. I doubt that very much.

Mr. MOORE. Two drilling rigs destroyed, three or four trucks, 3,000 or 4,000 barrels of oil, one life, two or three more—

Mr. FITZGERALD. Sure.

Mr. MOORE [continuing]. That saves money?

Mr. FITZGERALD. I don't believe I said that, sir.

Mr. MOORE. OK.

Mr. FITZGERALD. I hope I didn't imply it. I think that the individuals I know are competent to manage such programs, given adequate support and resources.

Mr. MOORE. My question is—that is an answer, I guess, from a bureaucrat, and it is bureaucratic language—I want to know if anybody in DOE knows anything about drilling into a salt cavity. That is what happened down there; nobody knew what the hell they were doing; it blew up. And my question is, does anybody know what they are doing down there, from your study of it? You have been down there, you say—

Mr. FITZGERALD. No, sir, I did not say that.

Mr. MOORE. You have not been down to New Orleans?

Mr. FITZGERALD. No, sir. Oh, I have been to New Orleans many times; I have worked there for years, but not looking at this program.

You know my testimony was fairly extensive on how little I had been able to get out of this. I was asked to look at the productivity, the effectiveness of the procurement approach, which I do know something about.

Mr. MOORE. OK then. We are talking about whether to go into a turnkey project or not?

Mr. FITZGERALD. Yes, sir.

Mr. MOORE. All right. It seems to me that would be one of the things you might consider as to whether you go to a turnkey project or not, is whether or not you, meaning the Government, know anything about what you are doing?

Mr. FITZGERALD. That was precisely my testimony.

Mr. MOORE. OK, and you think that the Department of Energy knows enough about what it is doing that it doesn't have to go to a turnkey project?

Mr. FITZGERALD. I don't think you should go into a turnkey project unless you can define what it is you are buying, and if you don't know what you are buying, you are certainly not ready to contract, and they could not convey to me that they knew exactly what they were going to buy.

We got—just this morning, as I went by the subcommittee to pick up documents—a statement of work that they say is being used to negotiate the new turnkey contracts. I have not read them, but they do not describe to us how they were going to avoid the same kind of problems we have had in the past with turnkey projects, and that was the gist of my testimony to the subcommittee, is that we should learn from past experience and not repeat the same mistake.

Mr. MOORE. We will, by the same token—I think the Hackberry explosion was a very serious mistake, according to the summaries of the reports that had been made in that explosion—it boils down to the fact that DOE was trying to move too fast and had too little experience, as well as some other problems?

Mr. FITZGERALD. I think that is the conclusion I would draw also from reading the report.

Mr. MOORE. Then my point is that you are looking at it from a procurement point of view, and you know far more about that than I do. I am looking at it from the point of view if we are going to have this program and if we are hellbent to do it and do it fast, aren't we better off hiring some experts to do it and take the completed project and operate it?

Mr. FITZGERALD. If you can do it that way, if you are willing to let big corporations go broke when they fail to meet their contractual requirements, sure; but my testimony was that the Government has never displayed a willingness to let big corporations take a loss on these giant programs, and this would be a giant.

Members of Congress have voted to bail out Lockheed and the shipbuilders and everybody else, who are experts; they are experts. There is no question about it.

Mr. DINGELL. Would the gentleman yield?

Mr. MOORE. I yield to the Chairman.

Mr. DINGELL. I think that is a very important point. It was not the actual state of affairs. At West Hackberry, work was not being done by technicians on the payroll of DOE. DOE was the contractor and the West Hackberry folks were the persons who did the actual work for DOE. Now isn't that a fact?

Mr. FITZGERALD. I understand that DOE has only a handful of people at each of the sites, that they do not do the actual work. I have never heard anyone say DOE did the drilling or the leaching or any of that.

Mr. DINGELL. Or the filling of the pipeline?

Mr. FITZGERALD. No, sir; none of it. It is being contracted now, as I understand it. It is just that the DOE is looking individually at the contracts and they claim they are learning a great deal from doing that. It is probably expensive on-the-job training.

Mr. MOORE. Mr. Chairman, our own report indicates deficiencies in management on the part of DOE in terms of their own management-engineering firm and themselves, and lack of experience is partially the fault of this explosion. And the point I am trying to make is, that, to me, it is a very good reason for them not to make any more decisions or not proceed ahead with this project, but to hire people who know what they are doing and buy the completed project. And there are two or three firms in Louisiana that have a great deal of experience in operating these salt domes require-

ments now for storage of various raw materials and finished products and what have you, and can do it, and some of them are giants and some are not.

I am inclined to think they can make a pretty good deal, and I will face the question as a Congressman whether we will bail them out or not at that time. I am not in favor of bailing out corporations if they can't do a contract. I just don't want to see any more explosions, and I don't want to see any more disruptions in the program.

I think that DOE has come up with a pretty good solution: To go to a turnkey project. It is a way to get around their problem of not having the expertise and not having the time to develop it. I am not sure they are developing. What difference does it make whether DOE knows how to drill an oil well or not, or puncture into a salt cavity? There are people in the world who do who can be hired. That is my point.

I appreciate your answers, Mr. Fitzgerald. I think maybe we are looking at it from a different point of view. I certainly agree with you, we shouldn't be bailing out corporations, and corporations ought to make a contract they can live with. My concern, is the fact that I think DOE realizes it has a problem in trying to complete this program and trying to look to a free enterprise solution to buy a completed project, and it generally makes sense.

Mr. Dingell. Mr. Fitzgerald, the committee thanks you.

The Chair advises our next witnesses will be Mr. George S. McIsaac, Assistant Secretary for Resource Applications, and Mr. Joseph DeLuca, Deputy Under Secretary for Strategic Petroleum Reserves, Department of Energy.

Mr. McIsaac we will recognize for the purpose of introducing your associates at the table, and then we will recognize you for your statement.

STATEMENTS OF GEORGE S. McISAAC, ASSISTANT SECRETARY FOR RESOURCE APPLICATIONS, DEPARTMENT OF ENERGY; JOSEPH R. DeLUCA, DEPUTY UNDER SECRETARY FOR STRATEGIC PETROLEUM RESERVE, ACCOMPANIED BY R. DOBIE LANGENKAMP, DEPUTY ASSISTANT SECRETARY, OIL, NATURAL GAS, AND SHALE RESOURCES; DONALD MAZUR, DIRECTOR, STRATEGIC PETROLEUM RESERVE OFFICE, NEW ORLEANS; CARLYLE R. HYSTAD, DIRECTOR, DEPARTMENT OF ENERGY TASK FORCE; ERIC FYGI, DEPUTY GENERAL COUNSEL; HILLARY RAUCH, DEPUTY PROCUREMENT DIRECTOR; GUY JOHN SCANGO, ACTING ASSISTANT PROJECT MANAGER FOR SYSTEMS AND ENGINEERING, STRATEGIC PETROLEUM RESERVE PROJECT MANAGEMENT OFFICE; TED SIOMPORAS, DIRECTOR OF PROCUREMENT, NEW ORLEANS PROJECT MANAGEMENT OFFICE; AND JOHN LANGMEAD, FINANCIAL MANAGEMENT

Mr. McISAAC. Accompanying me are Joseph DeLuca, Deputy Under Secretary, Strategic Petroleum Reserve; R. Dobie Langenkamp, Deputy Assistant Secretary, Oil, Natural Gas and Shale Resources; Donald Mazur, Director of the Strategic Petroleum Reserve Office in New Orleans; and Carlyle Hystad, Director, Department of Energy Task Force.

In addition, we have with us Mr. Eric Fygi, Deputy General Counsel of the Department; and Mr. Hillary Rauch, Deputy Procurement Director of the Department. We have with us immediately to our rear a number of technical and procurement specialists in the Strategic Petroleum Reserve Program Directorate here in Washington and from our New Orleans project office.

Mr. DINGELL. The committee welcomes you; we thank you for your assistance, and we will recognize you first, Mr. McIsaac, for such comments as you choose to make.

Perhaps we could submit your full statement in the record and recognize you for purposes of summary.

Mr. McISAAC. I have a very short statement, Mr. Chairman. With your permission, I would like to very quickly go through it.

Mr. DINGELL. Then you are recognized for that purpose.

Mr. McISAAC. Mr. Chairman, and members of the subcommittee, I am pleased to be with you today to discuss the strategic petroleum reserve program.

As you know, Secretary Schlesinger has recently elevated the strategic petroleum reserve responsibility within the Department of Energy. Joe DeLuca, who joined the SPR program as director this July, and who now serves as Deputy Under Secretary for the SPR, has made considerable progress in taking control of the SPR and stimulating development since that time. By background and ability he is equipped to continue to identify and correct program shortcomings. This decision, which has been under consideration for some time, reflects the fact that the SPR, perhaps the most essential and difficult near-term program within the Department, should have a position in the DOE organization consistent with its importance. This organizational change will help expedite support of the program throughout the Department and give additional emphasis to the priorities of this program.

Let me briefly provide some background relevant to the current program status and then Deputy Under Secretary DeLuca will give you his statement.

The Energy Policy and Conservation Act authorized the creation of a strategic petroleum reserve of up to 1 billion barrels of oil. Although the legislation included a target of 500 million barrels of crude oil and petroleum products to be in storage by the end of 1982, that target date was subsequently accelerated to 1980 by SPR Plan Amendment No. 1, which was submitted to the Congress in May of 1977. SPR Plan Amendment No. 2, submitted to the Congress in May 1978, expanded the size of the reserve from 500 million barrels to storage of 1 billion barrels by 1985 and provided for implementation of a 750-million barrel Government reserve. Decisions were to be made at a later date on the composition of the last 250 million barrels of protection.

The accelerated near term targets of 500 million barrels by the end of 1980, and 250 MMB by the end of 1978, were intentionally ambitious. In setting these targets both we and Congress recognized that their achievement depended on realization of optimistic assumptions regarding short term SPR development. The underlying philosophy was to set the most demanding goals that could be achieved because of concerns about the vulnerability of this country to the loss of oil imports.

Our foreign policy, national security, and economic interests indicated at that time we should make every reasonable effort to obtain a sizable strategic petroleum reserve as fast as possible. These interests continue to be valid today.

It was anticipated that these previous targets would assure that the SPR development would not be constrained by failing to explore every opportunity to accelerate program design, construction and oil fill, or the absence of resources to pursue these opportunities.

It also was anticipated that oil prices would increase substantially in the future, and that savings from buying oil sooner would offset any higher costs of facilities that could result from the accelerated schedule. Both of these points were discussed with the Congress as our plans were being considered.

Based on the experience we have gained in the course of pursuing these admittedly ambitious goals, we have now reexamined the schedule assumptions. We believe that our future projections of fill rates will be realistic based on our best current knowledge and consistent with effective and efficient program management.

Program implementation since the acceleration decision was made in early 1977 has been slower than we expected or like. It has not been possible to accelerate the environmental permitting process or the Federal procurement process as much as hoped. Unexpected technical difficulties arose which have delayed development. And numerous problems have occurred in the construction and operation activities.

Despite these events, much has been accomplished. The program has moved ahead and the framework is in place for completing the reserve in 1986.

The strategic petroleum reserve has been consistently supported by Congress and by this committee. We appreciate that fact and are here today to urge and hopefully justify your continued support of this program.

Deputy Under Secretary DeLuca will now discuss the SPR system, its development schedule and problems related thereto, facilities and facilities costs, steps we are taking to make improvements in SPR management, status of plans for using the reserve, and related reprogramming actions that we are considering.

Mr. DINGELL. We thank you for your assistance to the committee and for your testimony.

The Chair does advise it is the role of the committee to work with your agency as best we might and try to be as cooperative as we can, recognizing the responsibility of this committee to conduct vigorous and effective oversight of the conduct of the programs and to see that the intent of Congress is carried out.

We look forward to working with you and thank you for your assistance, and recognize now Mr. DeLuca.

STATEMENT OF JOSEPH R. DeLUCA

Mr. DeLUCA. Mr. Chairman, my name is Joe DeLuca. I joined the program in mid-July, so I am 5 months aged in the program.

Mr. DINGELL. We observe that you have a very lengthy statement. I think we should insert your full statement in the record

[see p. 32], and we will recognize you for such summary as you choose to give.

Mr. DELUCA. I would like to summarize a number of things, to put the program in perspective. My first appeal is to join hands with you in understanding and help. My second is full candor, a straightforward leveling approach to the committee, because of the ultimate judgments and responsibilities to the citizens of America in this national program.

I think my third comment would be on this program: it is neither too early to tell nor too late to stop. Both are doable this moment.

Fourth, the comparison between this program and the C-5, which has its own merits, at this point in time are untoward.

Fifth, we are not tarred of mismanagement. We are aggressive in better management. With that background, I would like to present to you where the SPR strategic reserve program stands. I would like to present first in the summary the perspectives that are essential to understanding where we stand today.

First is a roadmap. Secretary Schlesinger hired me and said, "Joe, come on in, troubleshoot the program, sort it out, and chart courses of action that are responsible to the law and achieve the national mission."

With the help of many people in the Department of Energy, not only field but also hard-working intelligent, dedicated headquarters people, I am about to present the results.

Now, for easy understanding, for incremental judgments—technical, schedule, cost, environmental, and all the other intricacies of this program—so that we in the executive branch, and you in the legislative branch, can decide how to proceed, I would like to describe phase I of this program. Sir—this is a roadmap of the decisions on the program, I will tell you here in phase I of this program, there are 248 million barrels underway. This is for real. This is blue-collar. It is being done. This morning, we have 64 million barrels stored—60 in the caverns and 4 in pipelines and tanks.

Three of the sites will be completed by the summer of 1979 with 150 million barrels. Two of the sites will be completed in the spring of 1980, with 98 more million barrels, so 248 million barrels will be in storage by the spring of 1980. In 18 months, that will be done.

Now, baseline for management, Ernie Fitzgerald never said a truer thing. You have got to have it. We have got it now. It is being built up in the last 9, 8, 7, 6, 5, 4, 3, 2, 1 months. There it is. This segment right here. There are work breakdown structures; there are level one, two, three, and four of detail; it is critical path management, network analysis, I will call it, the four major criticalities of the program. The first being acquisition, rights-of-way. You have got to have the dome before you can proceed.

The second being environmental. Today, based on the laws of our Nation for air and land and water and fish and fowl and humans, you have to do certain things. That takes study, compliance, and time. It is all in there.

Third, the technical: What are the line milestones that have to be done? What has to be built? What purposes, what motors, what pipelines, what caverns, what leaching, what has to be done?

Fourth in engineering drawings; levels one, two, and three reported.

Configuration control boards—CCB—established, chaired by my man on the right, Don Mazur, who is the project manager in New Orleans. If a change in the baseline has to be made, it has to process through the CCB, where the technical, the cost, the schedule considerations, the tradeoff analyses are done.

Schedule, cost, CP, critical path management—CPM—network analysis, monthly reports now in existence.

I agree with Ernie on them. We have it.

Sir, you can stop the program there; 248 million barrels 18 months from now done; \$841 million will be the cost. That runs about \$3.39 a barrel. But in there are many, many, many, many line items that were not in the original conceptual preliminary estimates, and I will get to those.

Still staying on the 248 million barrels, if I can now come to that little handout that I gave you that shows the map, just so we can put the geography in perspective, basically the six sites that are in phase I. Moving from New Orleans west, the St. James Terminal—that is the terminal on the west bank of the Mississippi that we have built at a cost of \$88 million. It carries two docks, six tanks, stores 2 million. Its purpose is increase of oil up the Capline interstate pipeline in case of need. The two sites it connects are Bayou Choctaw which will store 36 million barrels, and Weeks Island which will store 75. Bayou Choctaw is solution mined. Weeks Island is mechanically mined.

Moving westward is West Hackberry, where we had the fire. It will store 51 million barrels.

Sulphur Mines, which we are now starting, it will store 22 million barrels. Those two sites tie into Texoma an interstate pipeline, going up into Oklahoma for distribution to refineries.

On the far left is Bryan Mound. It will store 60 million barrels. It ties into the Seaway interstate pipeline.

Sir, that is the geography. That is the first 248. We can do it. We have the management on top of it.

Now, let me talk about cost for a second. The evolution of cost in this program has been cost recordation. We are now moving into the phase of cost control so that we can have good cost management.

Yes, there have been red books, green books, yellow books. You may have the red book. You may have any book we have, sir. The whole data file of the DOE/SPR system is open to you, wide-open candor.

The thing you must recall, however, is that the embryonics of this system were built on, in the 248, a multiplicity of individualized contracts. Over 150 of them. Some for engineering, some for hardware, some for services, some for construction management. It created an overburden of contracting management and of program management.

We have moved from that umbrella of multiplicity of individual contracts managed on a functional basis to an umbrella manager, which is Parsons-Gilbane as the construction manager. All of the work is done by industry. Fractured, fragmented, nonintegrated. That's what we must do, integrate it. We are doing that.

Now, before I move to phase II of the program, I would like to emphasize something that George McIsaac said. This is awfully important to understanding the motivation, the dedication, the decisions in this first 2½ years of the program. And, sir, if I can state it quite simply, although I am not a subscriber of slogans, cliches, observations generally applied without specificity, that the point that drove the program hard in the interests of the Nation is just this: The earlier the oil is acquired and stored, the lower the real cost to the United States. Now, that is a fundamental statement that guided the management of this program, consequently, the emphasis on storing as rapidly, as expeditiously, as possible. Consequently, today, when someone says, "You mean you have got 60 million barrels in the holes and you can't get it out" yes, sir, it means that, because that is the way the priorities conscientiously, in the context of the decision, were made. That is the way the priorities of design are; that is the way the application of funds are; and up until now that is the program. We are now moving into the phase of doing withdrawal engineering, and we will do that, and by the end of 1979 this will be withdrawable. But, remember, the earlier oils are acquired and stored, the lower the real cost to the United States. Later, you will hear the program was schedule driven. Yes, sir, it is schedule driven. We put in interim facilities. We put in interim fill systems, and now we are doing the permanent system, physically constructing.

We, also, in my 5 months are working on an integrated basis with the DOE headquarters people, procurement, legal, controller, and environmental, and my integrated staff in New Orleans; there are no field troops. They are all in my office. Some are in New Orleans; some are in Washington. Don Mazur and I are working colleagues, brother to brother; whatever headquarters intellect there is, and whatever field intellect there is, it is in both of us.

Along those lines, with Secretary McIsaac's permission and Secretary Schlesinger's approval, I have contracted the headquarters staff down to 56 people and Don Mazur's New Orleans staff, my staff in New Orleans on an integrate policy implementation basis, is now at 150 manpower spaces.

I do not appreciate the delineation between the headquarters and the field. It is one SPR management outfit.

Sir, if for some reason the committee, the Congress, feels we have mismanaged this program, schedulewise, costwise, now that you understand the motivation, and we that do not know what we are doing—which I don't agree with, we do know what we are doing—you can stop the program at the 248 million barrels. It will cost \$841 million. In the \$841 million will have been built an infrastructure of pipelines and terminals costing \$253 million. There is a pipeline from West Hackberry to Nederland, Tex., 42-inch diameter, 42 miles, \$49 million.

From Choctaw to St. James, 36 inch diameter, 39 miles, \$27 million.

From Weeks Island, 36-inch diameter, 67 miles, \$78 million.

The St. James terminal, \$88 million.

The only thing I am trying to say, sir—two things: It is one thing to build the cavern for storage. It is another thing to integrate it

logistically for fluid dynamics, and that is what this program is, a rather large complex fluid dynamics program.

What kind of fluids? Three. Water has to come from some source, has to be pumped into a salt dome, has to agitate within that salt dome and come out as brine which you then must dispose of through deep injection wells or through pipelines dispersing someplace. You have to put in seven barrels of water, agitate the dome, get out seven barrels of brine and create one barrel of cavity.

We have a water intake problem, a brine disposal flow, and then the oil coming in and coming out. Therefore, this is a program of fluid dynamics. The cavity of storage, the increase and egress of water, oil, and brine. It is a big program.

Now, phase I existing storage is the five sites you have on your map, plus the terminal. If that is what the Nation wants, as a strategic petroleum reserve at \$841 million, that is it; 18 months, done.

THE SCHEDULE

That schedule that said we would have 250 million barrels by December 1978, and 500 million by 1980, in my research on that, sir, in my 5 months, I will say that was done in good conscience but underestimating the complexity of the technical and the engineering aspects of this program.

Each salt dome has its own property peculiarities, and you must react—you can only react to that dome. I am going to let the engineers address that later.

Why did the schedule slip from 250 million barrels in 1978 to the 70 million barrels we are now talking about at the end of December? Fundamentally, sir, back in those days in late 1976 and early 1977 my research revealed, from conceptual, initial, geotechnical surveys it was deemed that certain cavities existed that must be brined by commercial industry and if you could acquire those cavities, flush them out, you could get a head start on the program. That is what phase I is; existing cavities previously brined by commercial companies: Allied, Dow, Olin, Morton. And we take over the cavity, solution or mechanically mined, clean it out, plumb it up and fill it, and in a later time period now by design, to withdraw it. That is how the program was established, in good conscience. If anybody had studied it. It is there on the record.

Now, what happened? Eighty-seven million barrels of presupposed cavern cavities did not make it. When you went in to determine the structural integrity by various sonar calibrations and techniques, 87 million barrels of those presupposed available cavities would not hold pressure, or could not sustain structural integrity. Therefore, the program had to lose those, and had to go to higher cost production of cavities. That is where cost growth starts now. That is not cost growth of underestimating; that is changing a base line.

We secured Weeks Island, from the Morton Salt people. Because of State economic agreements with the private sector, the continuation of mining by the Morton Salt people for producibility, marketability and bottom line and the continuation of employment required a joint utilization of the production shaft, which means we

could only do certain things; they did certain things. All of our equipment had to be disassembled in 4 by 8 foot dimension, carried down to huge levels, reassembled—think about that—in front-end loaders, booms, and so forth.

Because of this work economic marketability, joint utilization, there is an 11-month slippage on Weeks Island. That throws 75 million barrels out of the end December 1978 schedule.

Last, sir, brine disposal. Five months ago I did not know what the hell brine was. Now I live with it. The design parameters of these wells were that they would swallow, filter, digest, 30,000 barrels a day. In the last 6, 5, 4, 3, 2 months, when we really poured it into them, they just did not swallow at that rate. There are peculiarities; chemical insolubles, precipitates that clog that only let the filtering system run at 15,000–12,000 per day. There are all kinds of treatment that we have tried and the engineers are developing perforation, acidation, filtration, and so forth, but we did not have it, so we could not pour the oil in to get the brine out. So things happened.

We lost 16 million barrels of oil we could not put in, and yet in October, November and December when we lost the 16 million, those were our heavy logistical months. We had triggered from the Persian Gulf, from South America, from where we are buying the oil, a chain of ships assuming we could make it, not knowing the brine wells would not swallow. That caused demurrage.

We are over that hump now, but it did cause demurrage. It still brought oil, and our demurrage bill—and I am sorry to say it—for a year and a half is \$7 to \$8 million. That is bad management no matter how you look at it, but you have to keep it in context. It takes 55 days to trigger a ship from the Persian Gulf. It is about 25 days of ordinary ship time and 30 days of transit time, and once you triggered that ship in the middle of September, it was rolling for the first part of November and you had to do something with it. So what—

Mr. BARRETT. May I interrupt at this point?

Mr. DELUCA. Will you let me summarize the program, please? The chairman said understanding. That is my first petition. If you deny me, then you are not fulfilling the role of Congress. I stand in silence.

Mr. DINGELL. I am saying that you should proceed with your statement.

Mr. DELUCA. Thank you.

Now, sir, if I may move to whether you want to go/no-go with the expansion of two sites, West Hackberry and Bryan Mound. We can expand those two sites West Hackberry by 160 million barrels, and Bryan Mound by 120 million barrels, if you allow us to start. It is not too late to stop. We have not done anything at West Hackberry. The lack of funds for construction dictates no start. So if I can defer to Ernie, if you want to stop, stop.

Mr. DINGELL. Is there any action by this committee that is denying you the ability to go forward? I am curious as to this comment made by you because we have supported this program, as I am informed.

Mr. DELUCA. Ernie is a working colleague of mine and he said one of the things you have to do in good management, to which I

subscribe, is to be able as a program manager to put it on the line as to whether the program is too early to tell or too late to stop, and I am saying in this program we are telling early now and it is not too late to stop. We are moving ahead with Bryan Mound with the moneys that we have available to us. We have the detailed design on Bryan Mound, we have the detailed design on West Hackberry, and we are starting the drilling at Bryan Mound. We have the land, we have the environmental permits, we have some of the gear and we are moving ahead. West Hackberry is in a hold pattern.

To develop that 280 million takes a fill period from 1981 to 1985, 5, 6 years to do geophysically what has to be done, to leach the caverns, to fill them, to do the fluid dynamics, to put in pipelines, the pumps, the motors and the buildings and the instrumentation and the meters.

Sir, through there, through 248 million barrels there and that 280 million barrels here, of about 528 million barrels, I believe we are on reasonably solid ground. But I do want to give, again in comparison, the ulcers of a program and a project manager and his chief engineer.

Sure, we have worries. We are not guaranteeing that. Those salt properties dictate to us what happens, so does the weather in Louisiana. To go ahead with this, we have to solve the problems—some are easy—of regular availability, utility power, brine disposal either through injection wells or into the gulf. Now we have a pipeline approved by the EPA and by the Corps of Engineers 14 miles into the gulf, with a diffuser system which requires constant monitoring to take care of the potential damage to the water or the life in the water. That system alone gives us an added cost of \$20 to \$30 million not in the baseline of costs. We cannot proceed past February 28 without the reprogramming on the 280 million barrels. We have applied the bulk of money available to us, which is \$228 million, to continue phase I, the existing. It is an order of priorities, Congressman Gore, of fund availability.

Now I move to the highlighted subject of turnkey. Sir, why do we go turnkey? This is no C-5A. There is no research-development, test evaluation, production, hugeness, integrated logistics, all of those things push the state of the art of technology, not a huge contract. We go there, sir, for the very reason you were discussing this morning. This is a specialized job of creating caverns through solution mining or converting mechanically mine cavities for storage. There is no one in the DOE who knows that business. All our engineers are learning, and yet there is industry know-how.

Underground storage now is a way of commerce, and therefore it is being done. The point that I want to make is when we say we want to go turnkey is what are the advantages we are looking for? First let me answer that by, what are the disadvantages we are seeking to avoid? What we are seeking to avoid is our very experiences in phase I, a multiplicity of individualized, specialized so-called fixed-price contracts sought to be managed on a functional basis with only front-end engineering. In other words, we got half the system.

What we want is a systems approach to a salt dome or a stated amount of cavity. The work is the same on a 20 million barrel

cavity or 40. What we want is people to build on 20 million or more. That is just that cavern. We are not giving anybody all the caverns, just that site. People, as I have mentioned before—Dow, Allied, Olin, Morton, et cetera—have those cavities. They know how to mine them, they know how to solution-mine them. What we are saying to them, how about you doing the job technically, professionally, expertly?

We also want to avoid the kind of management that we had. But, sir, the work is the same on every dome. You have to do the geotechnical. Is the dome doable? You have to do the environmental and then you have to do the conceptual and initial design, and then the detail design and then the construction and then the fill and then the operation.

Industry does this, and we are saying do it in small sizes for us.

So the first thing we want is their expertise.

Two, all of the things that we have taken over have been taken over by eminent domain, declaration of taking. Negative, acrimony. I have talked to the people in Louisiana and Texas. We are not necessarily their kissing cousins. So if we could do something on a cooperative basis with the people who own the site, who are ready to make a businesslike prudent proposition, why shouldn't we go there? So the two things so far: expertise and accorded usability of site.

Third, once you study this you will find, sir, that what we are competing, once we get a site made available to us on a cooperative basis, is the very site against other sites, 2, 3, 4, 5, 6, 7, 8, 9, 10 sites. The know-how—they have to propose technically how they will meet our criteria.

Our statement of work is written, you have to read it to understand it, but it is written. It was written in conjunction with some passes at industry so that they and we knew program definition. That is what we want. It is what they must do.

Last, we compete price. So there is tremendous competition. There is no rip-off. There is no shedding of our responsibility.

Sir, if I may just take a second to say how the proposal reads. This is the proposal. Our procurement people, our legal people, we, the program people, have worked on this, and we have had pre-solicitation conferences. We had over a hundred people attend the conference.

It is a good net statement of work. It is out now to the industry. We hope to work it in two phases. The first is unpriced technicals. They come in and tell us, if they offer a site, how they would convert it and turn it over to us. All those technicalities are there.

We will receive all of those in January. We will analyze those technicals, we will do program definition with the proposers, and once they and we understand technically what is to be done and how it is to be done, we then ask them for a priced proposal including the contract provisions as they see them. That should come back to us in April. By July and August we will have analyzed the technicals, the economics, and the contract provisions. To assure ourselves again along the lines that Mr. Fitzgerald was talking about, we are preparing the analyses, the matrices of these three things. It is very detailed technical, price, and provisions.

We are currently oversubscribed for competitive reasons on the market. I would not like to say how much. I would be glad to tell you on the side.

What do we need in turnkey? If you allow us to proceed with the 248 million barrels of existing sites and allow us to proceed with the 280 million barrels of expansion which is 528 million, you could say the balance of the program is turnkey. That would be 400 million-plus barrels. I have to say one thing. Within the administration we are discussing in the current planning budgeting cycle, when the President makes his final decisions by the end of December, whether the program should be at 750 million, funded. That is—it is a billion-barrel objective, yes, but for reasons of the national economy should it be funded at 750 million barrels or a billion barrels in the 1979, 1980 dollars—1979 affected by reprogramming, 1980 affected by budget submit.

So we may be talking from 142 million to 392 million barrels to go turnkey. As I say down here on the bottom, decisions: DOE, OMB, President, Congress.

We will not go forward, Mr. Chairman, with turnkey unless we prove to you the Congress, let alone ourselves—and we are pretty hard taskmasters—that the technicals, economic, and contractual provisions, are in the best interests of the Government and also have some prudent understanding of the business bottom line.

We promise you that. Do not deny us going forward at least to get the data, as you said, a data base, a data point for decision. We will go nowhere without you. We could not. We would not. It is a national program.

Now, there are for turnkey three sites we currently are working: Ironton, Ohio; Napoleonville, La.; and Cote Blanche, La., which can be plugged like modules into the capline portion of SPR.

There are just 30 million barrels in Cote Blanche, and 30 million barrels in Napoleonville—plug them in. It takes 2 years of development and a year to fill them, so in about 3 years we pick up that 60 million barrels, and Ironton is 20 million barrels. Those are existing cavities which from a cost effective point of view, if the Nation really wants the oil in storage and withdrawable by that time, we can do sole-source negotiations. We will bring those proposals and our analysis to the committee for your consent or dissent. But it is a cost-effective way.

Let me just take Ironton. It is 20 million barrels—cavity, limestone mine—that is it. If we went turnkey, it would be with that one area and that operator. Who else? Whatever that is in dollars, do you mean to say that we cannot write a contract to manage a 20-million-barrel turnkey Ironton site when the specifics are so clear? We have had an unsolicited proposal. We have a Gulf Interstate conceptual pricing estimate. Do you mean to say that with the wherewithal of the Department of Energy, that we could not write a contract to protect the interests of the Government when you are only talking 20 million barrels—you use the number because I do not want to give it to the industry—but say it is \$2 or \$3 a barrel? That is a \$50-\$60 million contract. We can write that, we can manage that, we can CPM it, we can cost track it. That is turnkey. That is manageable. That is realistic. That is achievable.

That is bite size. So is Napoleonville, so is Cote Blanche. That is why I think we are getting proposals.

Sir, I cannot let you tarnish us that way through the Fitzgerald testimony.

Summarizing: we have a 3-phase program: (I) 248 million barrels on line—18 months, \$840 million; (II) 280 million additional barrels at existing sites—leach fill, 6-7 years to do—price, \$689 million. You can stop there. Turnkey, we will come to you with the proposals, with the analysis, the responses. You give us the go-ahead, non-go ahead. That is on the small Turnkey. On the large turnkeys, depending on the presidential-congressional decision as to whether it is 750 million or a billion barrels, we will come in with all the provisions. I say, sir, having diligently studied this, it is worthy of consideration without abstract condemnation, and submit it that way.

That is my summary.

[Mr. DeLuca's prepared statement and attached tables follow.]

STATEMENT OF
JOSEPH DeLUCA
DEPUTY UNDER SECRETARY FOR STRATEGIC PETROLEUM RESERVES
DEPARTMENT OF ENERGY

Mr. Chairman and Members of the Subcommittee on Energy and Power, I am pleased to be with you today to discuss the Strategic Petroleum Reserve Program.

Our accomplishments to date are as follows:

1. A total of about 64 million barrels (MMB) of crude oil are in storage at three sites and in pipelines and terminals:

- Bayou Choctaw, Louisiana (16 MMB)
- West Hackberry, Louisiana (19 MMB)
- Bryan Mound, Texas (26 MMB)
- Pipeline terminals, etc. (3 MMB)

2. We are currently filling these sites with crude oil at a rate of about 300,000 barrels per day.

3. Three pipeline constructions projects are complete and another is underway:

- Bryan Mound to the Seaway Terminal, Freeport, Texas - operational October 13, 1977;
- West Hackberry to Nederland, Texas - operational November 5, 1978;
- Bayou Choctaw to St. James, Louisiana - operational December 1, 1978; and
- Weeks Island to St. James, Louisiana - about 20% complete.

4. The St. James Marine Terminal is over half completed and should be operational by September 1, 1979.

5. Twenty-Six brine disposal wells with a capacity of about 300,000 barrels of brine per day have been completed.
6. Required permits for a 14-mile brine pipeline from Bryan Mound to the Gulf of Mexico have been obtained and construction is scheduled for completion in early January 1979.
7. Preparation of the Weeks Island mine for oil storage (75 million barrels) is well under way and should be completed in September of 1979.
8. Negotiations are well along for acquisition of a fifth site at Sulphur Mines, Louisiana.

I would like to elaborate on these milestones and provide background information on the components of the SPR program.

Oil Storage Sites

Five sites with total existing capacity of 248 million barrels have been selected. These are Bryan Mound, located in Brazoria County, Texas, and four sites located in Louisiana: West Hackberry in Cameron Parish; Weeks Island in Iberia Parish; Bayou Coctaw in Iberville Parish; and Sulphur Mines in Calcasieu Parish. All sites consist of existing underground solution-mined salt caverns with the exception of Weeks Island, which is

a sizeable operating salt mine. In addition, a marine terminal facility is being constructed at St. James, Louisiana, which connects to the Bayou Choctaw and Weeks Island sites.

Construction is underway at all sites except Sulphur Mines, which has not been acquired, although preliminary work such as cavern certification is complete.

Construction of the permanent facilities at Bryan Mound, West Hackberry, and Bayou Choctaw has proceeded to the point required for substantial oil fill. Drawdown facilities will be completed in 1979. Conversion of the Weeks Island mine and construction of permanent facilities at Weeks Island and the docks and terminal at St. James are progressing toward completion in September, 1979.

Pipeline construction associated with these sites is substantially complete. At Bryan Mound the 7-mile oil pipeline from the Seaway Marine Terminal to the site is operational. At West Hackberry a 42-mile oil pipeline from the Sun Marine Terminal to the site is operational. At Bayou Choctaw, a 39-mile oil pipeline tie-in from St. James, Louisiana, to the site is also operational. Additionally, a 67-mile oil pipeline from St. James to the Weeks Island mine is under construction with the 12 miles through the difficult terrain of the Atchafalaya Basin essentially complete.

Reflecting discussions when Mr. McIsaac appeared before this Committee in April 1978, additional analysis has been conducted to determine the need for regional storage of jet fuel and crude oil in Hawaii, and residual fuel oil on the East Coast. The question of the amount and location of regional and non-contiguous storage is now being considered by the Administration. Any plans for such storage will be submitted to the Congress for review as an Amendment to the SPR Plan prior to implementation.

System Development

The Department is responsible for overall program management but is utilizing industry under contract to DOE to carry out the physical design, construction, and operation of the SPR system. The Program consists of three phases: development of existing capacity at the 5 sites; expansion of two of these sites; and development of new site capacity through turnkey contracting.

The first phase provides for oil storage in the earliest time practical and consists of the five sites previously mentioned. At the present time DOE is well along in the implementation of this phase.

The second phase of SPR development is the planned expansion of two of the existing sites: Bryan Mound and West Hackberry. Facilities developed at these sites during the first phase will be supplemented and utilized for solution mining of additional underground storage capacity.

New solution-mined salt caverns will be developed through a procedure of leaching salt caverns, and these new caverns will be filled with oil in increments as sufficient new volume is leached. This procedure is a technology not previously employed in the U.S. although there has been experience on a smaller scale in West Germany. It is estimated that additional capacity of 280 million barrels will be developed and filled in this phase of the Program. A detailed Expansion Execution Plan has been developed for these two sites which addresses implementation plans, schedules, and resources. Land acquisition, long lead-time procurement and drilling have already been initiated at Bryan Mound for this Phase II Development.

Phase III is the development of new sites to provide the remaining SPR capacity. As a result of a re-evaluation of program needs, a new contracting approach for the program is planned. This is turnkey site development by industry.

Our experience has shown the approach we have followed to new site development - separate engineering, design, construction, and service contracts - is cumbersome. It requires numerous procurement actions with attendant delays. It involves us in a nearly parallel management mode with our contractors in site development. We must control individual changes in contracts to accommodate to construction events. These changes lead to amendments in our cost terms. We have decided that a "turnkey" approach to construct storage facilities on new sites could avoid many of these problems yet still be cost-effective for the government. This approach will enable us to purchase, lease, or rent a completed "storage package" that would be developed under a single contract by a single management entity. These "storage packages" could be selected from a variety of bidders. For example, we hope over 10 bidders would offer an aggregate oil storage capacity well in excess of our projected needs.

Assuming this bidding pattern, we would select those specific proposals for negotiation which were most advantageous to the government. In the negotiation process we would expect to set cost and schedule limits with appropriate incentives and penalties. Initial technical proposals are due to be submitted to DOE by January 23, 1979, and DOE plans to complete proposed evaluation during the summer of 1979.

Also using the turnkey approach, three separate procurement actions are underway for the development of small storage complexes which were previously selected by DOE as candidate storage sites. The turnkey contracts would be negotiated with the current owners/operators of these sites and provide for (1) approximately 20 million barrels of storage at Ironton, Ohio, (2) approximately 30 million barrels of storage at Napoleonville, Louisiana, and (3) approximately 30 million barrels of storage of Cote Blanche, Louisiana.

Oil Purchases

Oil acquisition contracts have been awarded by the Defense Fuel Supply Center (DFSC) for over 115 million barrels. These purchases will meet the SPR fill needs through March 1979. A total of \$3 billion has been transferred to the DFSC, our agent, for the purchase of oil. Of this amount contracts have been awarded for \$1.6 billion in oil purchases, while contracts for expenditure of the remainder \$1.4 billion, are expected to be awarded early next year for 1979 fill requirements.

To answer the Subcommittee's question on oil acquisition methods, procurements have been on both a long-range and spot market basis. Long-range oil contracts have been awarded and scheduled according to site specific construction and operations plans. Occasional spot market purchases have been made in order to insure that necessary oil can be delivered on short notice to correspond with our day-to-day operations. Delays in the construction schedule have caused some long-term contracts to be renegotiated in order to modify or extend delivery dates. Delays have also resulted in demurrage costs of \$7,917,089 over the period of July 1977 to December 10, 1978.

Our oil supply has come from four major supply areas. We have purchased approximately 26% from the Mexico and Caribbean area, 28% from the Persian Gulf, 33% from the North Sea, and 13% from the North African area. The average price paid is in line with market prices.

Development Schedule

Under the current development schedule, the SPR Program will have in permanent storage or in immediately available inventory about 70 million barrels of crude oil by the end of this year, 130 million barrels by June 30, 1979 and 160

million barrels by September 30, 1979. During 1980, the Reserve should contain a quarter of a billion barrels of crude oil. An annual site-by-site storage schedule is provided for your information.

Over the past year, as more experience was gained, the schedule was adjusted to reflect our best estimates of realistic development and fill operations. Your Committee and others were notified of schedule adjustments on January 24, March 3, October 13, and again three weeks ago informally through the Committee staff. We have tried to keep the Congress informed of schedule changes and the contributing factors which led to them.

The major reasons for schedule adjustments are as follows:

1. Problems associated with disposal of brine from the storage caverns have severely limited the fill rate at our three existing sites. We must rid ourselves of 1 barrel of brine for each barrel of oil stored. Such disposal is limited to diffusion into sandy geological formations through deep injection wells. Original contractor feasibility studies conducted on disposal wells in the Gulf Coast estimated an average rate in excess of 30,000 barrels per day for each well based on existing data regarding local

sand formations, and designs were based on this assessment. The current estimates, based on our operating experience with these wells, is that 10,000 to 15,000 barrels of brine disposal per day for each well is about all we can expect. In effect, the brine disposal limitations have cut estimated fill rates for the originally planned wells at these three SPR sites by more than half largely because the original estimates did not foresee the problems we are having. To try to correct the problems we have drilled more wells than planned.

While a concerted effort is underway to improve the deep well brine injection capabilities, we now think several months of study and experimentation with injection techniques will be required for a noticeable improvement of flow rates. Even allowing for the average 6 week delays we encountered in starting pipelines, the brine disposal problem has reduced fill by over 16 MBB in the last 3 months of 1978 alone.

The longer term solution to our brine problem is disposal into the Gulf of Mexico, but our efforts to accomplish this at Bryan Mound were delayed about 18 months by the environmental hearings and permitting process. A permit was recently issued by EPA for disposal of brine in the Gulf from Bryan Mound, but it is conditioned on a detailed monitoring of the

effects of such disposal. A brine disposal pipeline is being constructed and DOE is currently negotiating the elements of the monitoring plan with EPA and local environmentalist and fishermen groups.

2. To avoid significant unemployment at the Weeks Island salt mine, we absorbed a significant disruption in our original fill schedule, resulting in a 75 million barrel reduction in the 1978 estimate. This large conventional salt mine was being operated by the Morton Salt Company at the time of acquisition for the SPR. To avoid a shutdown of the mining operation and associated unemployment of up to 300 mine workers, an agreement was reached with Morton to permit it to continue operations while opening a new mine nearby. This agreement required development of alternative conversion plans due to joint utilization of the mine shafts. Work could not be initiated immediately when the site was acquired in October 1977 and the planned construction schedule has been delayed by 11 months. We plan to commence fill at the Weeks Island Mine in late summer 1979.

3. The usable cavern volume in the five initial sites has been reduced by 87 million barrels from our original estimates because of technical problems, concerns about local employment, and too generous initial estimates of

the capacity of certain caverns. The major portion of this lost volume is attributable to the Bayou Choctaw site where technical problems such as the failure of existing caverns to hold pressure resulted in the loss of 38 million barrels of planned storage capacity. An additional 20 million barrels at Bayou Choctaw were not acquired in order to avoid the severe impacts on the area's chemical industry resulting from loss of storage for feedstock and hydrocarbon products. The remaining reduction resulted from the differences between capacity estimates carried out as part of the original SPR feasibility studies and actual volumetric surveys conducted after the sites were acquired. The reductions attributable to this change were 3 million barrels at Bryan Mound, 10 million barrels at West Hackberry, 14 million barrels at Weeks Island, and 2 million barrels at Sulphur Mines.

4. Delays in construction have occurred due to unanticipated technical problems and events beyond SPR's control. For example, at Bayou Choctaw construction was delayed not only due to problems with cavern certification, but an abandoned cavern was discovered at the site that raised concerns about the stability of the salt structure surrounding that cavern. A detailed geo-technical study was conducted that delayed

both design and construction, and a redesign of permanent facilities was required to move the facilities away from the abandoned cavern.

Strikes and injunctions have also contributed to construction delays. At Bryan Mound, a temporary restraining order issued in response to a challenge to the Davis Bacon wage rates delayed award of construction contracts by seven weeks. Temporary restraining orders regarding right-of-way disputes were issued after construction started on the West Hackberry pipeline causing a 3-week delay. Simultaneously, labor problems delayed construction progress at West Hackberry and St. James.

5. Real estate acquisition, particularly for pipeline rights-of-way, has presented a significant problem. Because of the numerous landowners involved, an extended period for negotiations has been necessary. Further, typical government appraisal values were below prices paid by private industry, so the majority of tracts had to be acquired through condemnation proceedings. Since the Federal District Courts reacted sympathetically to the landowners in condemnation disputes, transfer of possession of property was frequently delayed until after hearings, and in some cases possession was denied.

6. The schedules for leaching new caverns for existing sites were originally based on limited feasibility studies. More detailed technical analysis, carried out since last May,

has shown that there are many more variables affecting leaching schedules than had been anticipated. The data obtained on the salt properties at the sites has shown a much higher insoluble content than anticipated. The data obtained on the salt properties at the sites has shown a much higher insoluble content than anticipated. This requires the leaching of bigger sumps prior to development of the caverns and this will delay initial oil fill in each new cavern by approximately 6 month. Also more realistic times associated with startup and system expansion and maintenance during the leaching process have now been built into our schedule, and oil fill rates have been revised to be consistent with the logistics constraints associated with oil acquisition and transportation. Altogether these changes have led to a significant but realistic stretchout of the time required to expand existing sites.

7. A number of procurement problems and delays have been encountered. A portion of the sector of industry participating in SPR equipment and construction contracts was unfamiliar with the government procurement process and the Federal Procurement Regulations. This has resulted in a limited number of bids for some procurements, totally unresponsive bids, a need to readvertise some procurements, or extended negotiations with the firms responding. Early on, an insufficient number of procurement specialists were available to handle the amount of work required on an expedited basis. But during the past year,

a dedicated procurement staff has been established in the New Orleans Office. In addition, greater responsibility for contracting has been transferred to the Department's prime construction management contractor. These changes have improved the timeliness of procurements associated with the Program.

SPR Facilities Cost

When detailed facilities design was completed and construction contracts were awarded earlier this year, it became apparent from our completed constructed procurements that actual costs would exceed our estimates, but the magnitude of the increase was not clear. As construction proceeded this summer and fall, a number of actions were taken to attempt to reduce the facilities costs through value engineering, modifications of design requirements and attempts at improving industry bid competition. In spite of that effort, facilities costs continued to increase.

The original SPR plan estimated facilities costs at \$1.53 per barrel for the then proposed reserve of 500MM barrels. As a result of the November program review, we now estimate facilities costs at \$2.98 per barrel. For the first 500 million barrels then, the total cost would be \$1,490 million or an increase of \$725 million over the original estimate. A 750 million barrel reserve is estimated to cost \$2,500 million for facilities development. This is an average per barrel of about \$3.35.

At this time we have not developed a cost estimate for a fourth 250 million barrels of the SPR because the pending procurement of turnkey sites for a fourth 250 million barrel increment is in an early stage. If underground salt cavern storage will be used and if the per barrel cost for existing and expansion sites is correct, preliminary estimates of the per barrel cost for the last 250 million barrels would escalate the \$3.35 per barrel cost mentioned above to about \$4.00 when an allowance for inflation is included. On this basis, a billion barrel SPR would cost approximately \$3.5 billion for facilities development; and the average per barrel cost for the total system would be \$3.50.

Facilities Cost Growth

The total increase in facilities costs can be traced to several problems. These include:

1. Poor initial estimates of facility requirements

The SPR Plan cost estimates were based on feasibility studies which did not completely describe the required facilities. Several significant items required for a complete, safe, and secure storage system were not of appropriate size or quality as contained in the initial estimates. These included: an oil drawdown and distribution system, a sufficiency of cavern entry wells, marine terminal facilities, dikes around wellheads, fire fighting systems, concrete well pads, size and quality of buildings for personnel and equipment, instrumentation systems to control oil and brine flows, and security systems.

For example, the oil distribution facilities originally envisioned for West Hackberry and Bayou Choctaw consisted of tanker docks and relatively short pipelines from nearby waterways. Although these facilities would have been adequate for filling the sites, drawdown rates from the sites would have been severely limited because of the need to transport all oil by tankers during a drawdown. The Department determined that the sites would have to be directly tied into the U.S. Commercial interstate pipeline network, specifically at the Texoma and Capline crude oil pipelines. Feasibility cost estimates for these two oil distribution systems were about \$64 million; today's actual cost is approximately \$156 million for two oil pipelines and the St. Jame Marine Terminal which will support both the Bayou Choctaw and Weeks Island storage sites.

The feasibility studies also underestimated the amount of drilling that would be required to develop SPR sites. In 1976, the estimated number of brine disposal and reentry wells was 50; today's detailed designs include a total of 61 wells to meet system fill and withdrawal rates. This is a significant variance since well drilling costs are averaging \$1.1 million per well.

2. Inflation

Cost escalation is a major factor in the growth of SPR facilities costs. The cost of oil field equipment and services has increased significantly over the last two

years, particularly since demand in this sector of the economy has been high. Annual rates of inflation since 1976 when the the feasibility study cost estimates were prepared have been: 6 percent for electrical equipment, 8 percent for mechanical equipment, 7.5 per cent for steel products and 11 percent for construction labor and engineering. No escalation factor was used in the earlier estimate. A 10 percent contingency factor was used in the \$1.53 per barrel estimate but this contingency was included to fund items not considered in the feasibility study, not cost escalation.

Some examples of the cost growth experienced by the Program are as follows: The 1976 estimate for the 42-mile West Hackberry pipeline was about \$32 million; costs for the completed line will be very close to \$46 million.

The effect of inflation has been to increase the cost of almost every aspect of SPR facilities development.

3. Loss of low cost capacity

Original cost estimates were based on preliminary information about the capacities of existing conventional mines and solution-mined caverns. As discussed earlier, mine and cavern volumetric surveys and certification tests conducted by the Department at five sites have shown that the earlier site capacities were overstated. Of the 331 million barrels originally estimated, only 244 million are actually available for oil storage. The Department must now develop 87 million

barrels of capacity by means of the higher cost method of leaching new solution-mined caverns. This additional capacity will have to be replaced at a cost of about \$4.00 per barrel or about \$2.50 more than the original estimate for conversion of existing capacity of \$1.58 per barrel.

4. Schedule Adherence

Actions to accelerate the SPR construction and fill schedule have also increased costs. Temporary facilities were constructed to begin storing oil at the earliest possible time. These systems came on-line in 1977 and enabled the government to start filling the sites before permanent systems would have allowed. These interim systems were scheduled to be phased-out this year, but it was decided to augment and retain them to increase the total flow of oil into the sites. This was done while permanent system facilities became operational and continues concurrently with permanent system fill.

The total construction cost for the temporary fill systems was approximately \$15 million. Permanent system construction has also been accelerated where possible by providing for overtime expenses in key contracts which have a direct impact on storing oil.

5. Additional facilities required by the environmental permit process

A number of design changes were required in order to obtain environmental permits. These included extending the brine disposal pipeline at a Texas site 14.2 miles into the Gulf, rather than the planned 7.8 miles which DOE had found to be environmentally acceptable. This will increase construction costs by about \$20 million at that site alone. In addition, an expensive brine dispersion monitoring system is being designed to insure compliance with EPA permit requirements, which will cost about \$10 million to design and implement. At a second site, it has been necessary to redesign a raw water pipeline and intake structure from its original location on a nearby lake to a more distant site on the intracoastal waterway in order to minimize adverse impacts on the fishing industry, at an added cost of \$8 million.

Management Improvements

Recognizing that the procurement and construction activities for a program of this size and complexity could not be run effectively from a program directorate in Washington, Under Secretary Myers made a decision in January 1978 to establish a project management office in New Orleans, Louisiana. Don Mazur was appointed Director the same month and the Office was assembled in Washington and sent to New Orleans on May 1, 1978. I was then appointed program director in July.

Also in January, a decision was made to increase the role of the SPR construction manager, Parson-Gilbane, by having them assume responsibility as prime contractor for a number of construction efforts. Parsons-Gilbane subsequently moved their construction management offices from Houston to New Orleans to collocate with our project office.

Throughout the year, as actual construction experience was accumulated, we have held continuous reviews of progress. In addition, in August and again in late October, reviews were held of our plans for further development of the SPR. The October review culminated in a report to the Secretary in early November on the problems we had experienced, with resulting recommendations to substantially change the existing schedule and cost projections. The results of this review were communicated to the Committee staff in the last week of November.

During the course of the October review, decisions were made to adopt the turnkey approach for construction contracting and to proceed with requests for proposal. In November we opened discussions with the Army Corps of Engineers to explore how the Corps might assist us in the construction management of the expansion and new sites. These discussions are now proceeding.

Plans for Using the SPR

The preparation for using the SPR in the event of an oil import interruption consists of two major elements: (1) establishing the necessary policy, regulatory and administrative framework for using the Reserve and (2) the physical facilities and operating plans to move the oil.

In the first area, the DOE staff is now completing studies of alternatives and preparing recommendations for the Secretary's decision. It is planned to resolve these issues and submit an Amendment to the SPR Plan to reflect the decisions.

A comprehensive SPR drawdown management plan involving engineering and logistics disciplines is now under development: evaluating system site capabilities; developing system integration requirements; establishing system performance criteria; and determining engineering retrofit requirements. This comprehensive drawdown plan is projected for completion in June 1979.

Reprogramming

A decision was made late in FY 1978 that a reprogramming of funds from oil acquisition to facilities development would permit uninterrupted facilities construction and operations within the current budget authority of the Program. The Department planned to submit a partial reprogramming proposal to cover the first 5-months of fiscal year 1979 in October and then in January 1979 submit to the Congress a request for another reprogramming for the balance of FY 1979.

On October 4, 1978, the Controller of the Department submitted a reprogramming request of \$450 million to Congress on behalf of the SPR. By letter dated October 11, that request was deferred by Representatives Sidney R. Yates and Joseph M. McDade. As a result we have to set new priorities of all facilities development activities associated with phases two and three of the Program. The existing SPR sites, which will provide 248 million barrels of ultimate oil storage, have been assigned top priority for funding and will receive approximately 60 percent of the available funds through February 1979. No schedule slip is anticipated because of lack of funds at these sites.

Phase two of the Program is being allocated about 35 percent of the available facilities funds. This level of funding, however, will permit construction startup of only the Bryan Mound expansion; the West Hackberry expansion will be deferred until reprogrammed funds are available.

The remaining 5 percent of available funds is being used to initiate phase three of the Program. Preliminary design work and solicitation of technical proposals from industry are being financed with these funds. However, facilities development cannot be initiated for turnkey projects until additional funds become available. A site-by-site breakout of estimated FY 1979 obligations for phase one and two is provided for your information.

Congressional approval for the reprogramming of oil acquisition funds to facility development is of critical importance to the SPR Program. Facility development will be curtailed and oil fill will be impacted in March 1979, if the request is denied or deferred beyond February 1979. We also believe the implementation of the SPR Program will be further delayed if Congressional approval of the Department's reprogramming request is denied or deferred beyond FY 1979. We will transmit a revised reprogramming request in the future.

Thank you for the opportunity to summarize Program status. My staff and I are prepared to answer more specific questions at this time.

STRATEGIC PETROLEUM RESERVE
CALENDAR YEAR CUMULATIVE FILL (MMB)

Phase I	1978	1979	1980	1981	1982	1983	1984	1985	1986
<u>Existing Sites</u>									
Bryan Mound	28	60	60	60	60	60	60	60	60
West Hackberry	23	51	51	51	51	51	51	51	51
Bayou Choctaw	17	36	36	36	36	36	36	36	36
Weeks Island		25	75	75	75	75	75	75	75
Sulphur Mines		19	22	22	22	22	22	22	22
Tanks & Pipelines	4	4	4	4	4	4	4	4	4
Subtotal	72	195	248	248	248	248	248	248	248
Phase II									
<u>Expansion of Existing Sites</u>									
Bryan Mound Expansion				22	36	64	92	120	120
West Hackberry Expansion				10	34	74	115	155	160
Subtotal				32	70	138	207	275	280
Cumulative	72	195	248	280	318	386	455	523	523
Phase III									
<u>New Sites (Turnkey-Negotiating)</u>									
Ironton				20	20	20	20	20	20
Cote Blanche				30	30	30	30	30	30
Napoleonville (Existing)				18	30	30	30	30	30
Subtotal				68	80	80	80	80	80
Cumulative	72	195	248	348	398	466	535	603	603

STRATEGIC PETROLEUM RESERVE
 FY 1979 STORAGE FACILITY DEVELOPMENT
 CURRENT ESTIMATE OF OBLIGATIONS (OMB)
 (in thousands of dollars)

PHASE I:

<u>Existing Sites</u>	<u>Current Estimate of Obligations FY 1979</u>
Bryan Mound	\$ 21,596
West Hackberry	41,761
Bayou Choctaw	48,138
Weeks Island	70,882
Sulphur Mines	27,743
St. James Terminal	<u>13,859</u>
Subtotal	223,979

PHASE II:

Sustaining Operations	997
Withdrawal Engineering	<u>20,000</u>
Cumulative	244,976

Expansion of Existing Sites

Bryan Mound Expansion	140,000
West Hackberry Expansion	240,000
Bayou Choctaw Expansion	<u>2,117</u>
Subtotal	\$ 382,117
Cumulative	\$ 627,093

Mr. DINGELL. Thank you very much.

The Chair is going to recognize Mr. Barrett for questions at this time.

Mr. BARRETT. Mr. DeLuca, you talked about the Ironton mine contract. This is a sole-source proposal with what companies?

Mr. DELUCA. Ironton Mine is owned by the Alpha Portland Cement Co., and they have engaged Fenix & Scisson to do the engineering and conversion.

Mr. BARRETT. Didn't you have some unfortunate experiences with Fenix & Scisson earlier in the program?

Mr. DELUCA. I have had no unfortunate experience with Fenix & Scisson.

Mr. BARRETT. Has the program had an unfortunate experience with Fenix & Scisson?

Mr. DELUCA. The program, as far as I am aware of, has not had none. I do not know.

Mr. BARRETT. Mr. Mazur, could you—

Mr. MAZUR. I have had no unfortunate experience with Fenix & Scisson.

Mr. BARRETT. Was not Fenix & Scisson the company that failed to include site preparation costs, such as building of roads and building of dikes in their original design estimates?

Mr. MAZUR. I do not know.

Mr. BARRETT. Can somebody answer that? Mr. Hystad perhaps?

Mr. HYSTAD. Fenix & Scisson was the contractor for the initial feasibility studies for the solution mining caverns. They were operating under instructions provided to them by the FEA as to what should be done, and we felt that, in terms of the instructions they had, their work was satisfactory.

Mr. DINGELL. Was satisfactory or not?

Mr. HYSTAD. It was satisfactory, yes. Now it is true that the feasibility studies that were done did leave out several items of structure which we later added for distribution of the oil into the interstate pipelines. But I do not think we can say that is the fault of Fenix & Scisson for not including them. They were not instructed to do so.

Mr. DINGELL. What terms were excluded either by DOE or by the contractor?

Mr. HYSTAD. There were a number of items. The most costly probably were the pipeline connections to the interstate pipelines of Capline and Texoma. The original plans had connections to tanker docks which would have been located very close to the salt domes. But that would have meant in a draw down we would have to move all the oil out by tanker. It would have resulted in a lot of congestion on the Mississippi and in the Sabine River, and it was concluded that was not desirable and we should have a pipeline go directly to the terminals of Texoma and Capline as well as through the tanker docks at those locations so we could move oil directly into the major pipelines as well as loading tankers. That results in a major change in the scope of the work ultimately.

Mr. BARRETT. Nobody pointed out to you that you had forgotten these items such as roads, diking, and so on, on the estimates?

Mr. HYSTAD. I think the question of the onsite work related primarily to what would be required to meet an environmental

permit requirement from the Corps of Engineers and from the State of Louisiana. There were additional requirements to meet the environmental specifications, safety requirements, and so forth, which were not included to that level in the feasibility studies.

Mr. BARRETT. Mr. DeLuca, the Ironton Mine will hold some 20 million barrels in capacity?

Mr. DELUCA. Yes.

Mr. BARRETT. What refineries will that reserve supply?

Mr. DELUCA. Ashland Refinery.

Mr. BARRETT. The Ashland Refinery at Catlettsburg?

Mr. DELUCA. Kentucky, yes, sir.

Mr. BARRETT. That is a 140,000 barrels-a-day refinery?

Mr. DELUCA. Yes.

Mr. BARRETT. That is 140 days. In effect you are giving Ashland Oil Co. its own private SPR?

Mr. DELUCA. What you get into in a case like this is the scenario of the embargo, the scenario of the interruption, the severity of it, the duration of it, and where you allocate your oil. Ashland Refinery is a refinery like any other refinery. At a point in time if they would have gotten something, they now get less from this. This is in the context of a total distribution system. If for some reason your point is we should not give it to them, then the Ironton site we should not do. I do not feel that way because it is in a logistical complex of serving the Nation in time of need, and this is a refinery like any other one. It will get the offsets like somebody else.

Mr. BARRETT. This is 145 days supply. What is the overall SPR supply plan? How many days?

Mr. HYSTAD. We are talking about at least 150 days' supply from the reserve. What would happen, in the event of an interruption? First, some of the oil now going to Ashland would probably be cut off. To the extent that all of the oil was not cut off, we would have an arrangement whereby uninterrupted imports could be diverted to other refiners so that we could draw down the Ironton site. The uninterrupted imports to Ashland would go to serve other refiners and in effect serve the function of a SPR.

Mr. McISAAC. I believe as well that Ashland—correct me if I am mistaken—is planning to expand its daily capacity. I will have to check that but I believe that is correct.

Mr. DELUCA. It will be in their proposal. They are going to expand. I do not want to commit them until they commit themselves to the Government.

Mr. BARRETT. What discussions have you had with capline?

Mr. DELUCA. The discussions with capline and with Texoma and Seaway from—you mean only as it relates to—

Mr. BARRETT. As to their handling of the strategic reserves.

Mr. DELUCA. You mean in terms of an embargo?

Mr. BARRETT. In terms of withdrawal.

Mr. DELUCA. I at this point have not engaged in any of that, Mr. Barrett. I would have to defer to the planners.

Mr. HYSTAD. Discussions have been held with managers of Capline, Texoma, and Seaway. We intend to work out detailed contractual arrangements for physical connections between our terminals and the Capline terminal, for example. In the case of Texoma,

we already have arrangements where Sunoco is in effect our contractor to handle that oil, and they would also have the capability to take the oil directly into Texoma and go up the pipeline into Oklahoma and then into the Midwest.

Mr. BARRETT. But at the present time you have no formal agreement with Capline or Texoma?

Mr. HYSTAD. That is right. We do not have a formal agreement at this point.

Mr. BARRETT. Do you know what kind of oil Capline carries?

Mr. HYSTAD. Yes; we have a detailed breakdown of the types of oil that go up.

Mr. BARRETT. Is it primarily domestic or foreign?

Mr. HYSTAD. It is about, as I recall, 80 percent imported oil.

Mr. BARRETT. How much?

Mr. HYSTAD. About 80 percent imported oil. That is my recollection. It is in that neighborhood.

Mr. BARRETT. Have you had discussions with the refineries on the Capline system?

Mr. HYSTAD. We have had extensive discussions with the petroleum companies regarding two things: One, what type of oil to store, and how it would be distributed during an interruption. I do not believe we have talked with everyone on the Capline system, but we have talked to a number of the refiners who have refineries in that area.

Mr. BARRETT. So you know what their requirements are in the event of an embargo?

Mr. HYSTAD. We have a detailed study of the requirements of the refiners now and projections out to 1985.

Mr. BARRETT. Do you have requirements in terms of sweet versus sour?

Mr. HYSTAD. Yes; we have projections of the sweet and sour mixout in 1980 and 1985 time frames.

Mr. BARRETT. Are these presently in formal plans, withdrawal plans or such?

Mr. HYSTAD. The plan as to what type of oil to store was based on this analysis. It was done in 1976 originally and updated this past several months, the conclusions being very similar, with some slight changes. But that will go into our overall detailed plan as to how we move the oil out from these sites up the pipelines.

The refiners, the industry, have generally agreed with our mix of oils that we are storing and our capabilities to move those mixes up the pipelines.

Mr. BARRETT. Mr. DeLuca, you testified to demurrage running about \$7.9 million, and that is at the point I interrupted you and I am sorry. I just wanted to expand on that. While it is \$7.9 million from July of last year, it is \$2½ million per month for the last 2 months?

Mr. DELUCA. Yes, sir. Absolutely. The \$7.9 million was for that whole time period, but positively the last 2 months where we had this logistics chain coming that I was talking about and we ran into the brine nonswallow problem, the October demurrage is \$2.4 million and the November is \$2.2 million, and that is what I said. That is tough, it is bad, it should not happen. It did happen. I apologize. It is a bad form of management. But nevertheless the

logistics chain is coming and we were counting on the schedule. It shows that we believed ourselves that the brine would swallow. That is bad, yes, sir, I agree with you. But let me say this—

Mr. BARRETT. It is still coming in?

Mr. DELUCA. No; we will have worked our way out of this demurrage thing in January. We are in good shape. For example, in the first 15 days of December Don has been able to put 4 million barrels into the caverns. This is the best that we have ever done. We are getting pretty close to hitting 300,000 barrels a day. In the first 15 days we got 4 million barrels and hopefully we will do the same in the last 15 days.

In 1979 we have a very tough hard-going year again because the schedule in our testimony shows we are going to move this program from the 72 million barrels at the end of this year to 195 million, about 120 million barrels, which means we have to hack about 10 million barrels a month. We are going to hack eight. I think we are in pretty good shape on that.

Mr. DINGELL. Eight million a day or eight million a month?

Mr. DELUCA. Eight million barrels a month.

As I say, we finally hit 4 million in the first 15 days of December. That is the beginning, the beginning of the unraveling of the demurrage problem.

Mr. DINGELL. How much of that demurrage problem is solved by displacing Iranian oil which fell off because of the shortfall in oil production over there due to the strike?

Mr. DELUCA. That we had coming, Mr. Chairman, we had coming.

Mr. DINGELL. You did not use that to replace Iranian oil?

Mr. DELUCA. No. Is there a correction to that?

Mr. ROBINSON. We lost only one to the Iranian situation.

Mr. DELUCA. That was Bill Robinson from the Defense Fuel Supply Center, sir.

Mr. DINGELL. Mr. Barrett.

Mr. BARRETT. Could I go back to the first week in March of 1978. It was before your time, Mr. DeLuca. The first week of March the officials now in the New Orleans office had done an estimate of the cost to complete and the cost of the first 250 million barrels. Is that not correct—the red book?

Mr. MAZUR. We initiated the cost estimate for the first 250 million barrels to establish the breakdown by site and the uncertainty of the cost, which we then would continue to upgrade and using our management mode to control by site. That was initiated in March, and, yes, it was called the red book.

Mr. BARRETT. That figure shows originally, I believe, \$810 million in construction costs for the first 250 million barrels?

Mr. MAZUR. The red book itself showed \$725 million but in addition to that, in the review by the project office, program office at the time, we added another \$14.6 million for contingency that we thought was light. Then on top of that, given what we were looking at in terms of the schedule and the uncertainties, we identified another \$70 million as we called it, a management reserve. This was primarily directed toward need for acceleration, short time spans on schedule, which would dictate premium time

for construction, and so forth. We would put into a management reserve and manage as necessary if it was deemed appropriate.

The sum of those three numbers, the \$725 million, the \$14.6 million and the \$70 million make up the number you refer to.

Mr. BARRETT. The \$810 million, that figure was ready by the first of March?

Mr. MAZUR. That figure was developed in the March time frame, that is correct.

Mr. BARRETT. You subsequently found out that you had left out an incentive fee and the price was raised from \$810 to \$840 million sometime in June?

Mr. MAZUR. Putting things in perspective, the project office was established in January and initially staffed here in Washington, moved to New Orleans the latter part of April. Following the development of that \$818 million estimate in New Orleans, we initiated a detailed bottoms-up estimate again to look for the uncertainties, what might have been left out, and so forth.

It then evolved in further detailing of that estimate, which is an evolution, it did identify, yes, in the transference of a large percentage of the subcontracting, and contracting mode to Parsons Gilbane, but in the fee arrangement we had to add another \$16 million in our estimate, raising the \$810 million to \$826 million, and then the current estimate, which is again an evolution of that process, as an added or additional contingency plus the stretch-out in the operation and maintenance mode, leading to \$840 million.

Mr. BARRETT. Was Mr. Meyers briefed the first week in March with respect to your estimates as to cost?

Mr. MAZUR. We had a briefing at the time to lay out the basics and what we were up against, where the uncertainties were, and what further work had to be done in order to package the costs.

Mr. BARRETT. At that point you were talking \$810 million?

Mr. MAZUR. Including the \$70 million management reserve which was identified as something that may or may not come to pass, depending on how construction developed and the conditions in the States of Louisiana and Texas, primarily with the assumption of the schedule, and so forth, depended very heavily on timely acquisition of land. If the land was not acquired in the time frame to allow the construction to proceed, some of that time may have to be made up by accelerating construction. Those things were unknown and we were doing our best to attempt—

Mr. BARRETT. You were doing your best to estimate in March? You said \$810 million for construction?

Mr. MAZUR. A preliminary start of estimating leading to development of our current estimate.

Mr. BARRETT. My point is, Mr. McIsaac testified on the 13th of March and then we had two energy actions in which the figures that were cited were \$835 million for construction costs for the first 500 million, and I think that is a matter of some concern.

Mr. McISAAC. I believe it should be, Mr. Barrett. It is of concern to me as well. I have never delivered figures to the committee, nor is it ever my intent to deliver figures to the committee that are not as current and accurate as we can make them. I believe the circumstances we are dealing with here is one of where the project office, which was then here in Washington before it moved to New

Orleans, had been asked to develop estimates, preliminary figures with regard to submission of the 1980 budget. I think that those figures were developed, and I am not sure exactly when they were developed—I knew of no existence of the red book by the 15th of March or even by the end of March—but I think those figures that were developed were examined very carefully, and I think they were examined after the March time frame. I think they were originally, or at least I have been told here, they were developed by our construction manager, Parsons Gilbane, through a substantial communications process back and forth with the examination of those figures, and I think once they were hardened and proven out, they entered into a budget submission.

Carlyle, do you have any recollection of that particular sequence?

Mr. HYSTAD. I guess my recollection is along the following lines, that the original estimate referred to as the red book was perceived by many people in DOE as not being a very reliable estimate. There was a substantial amount of concern about whether those estimates were good enough to serve as the basis for a reestimate of the cost. The conclusion was they were not good enough.

There was also a decision then to look at what could be done to reduce those costs in the way of changing design requirements, for example, so there was the hope or expectation that those cost estimates might be revised through that effort.

We also did not have an estimate of what it would cost to complete the remainder of the 500 million. You understand our original estimate was tied to the 500 million barrels, and we wanted to try to get an estimate for the cost to complete the 500 million barrels, and that effort was not actually completed until the late summer or early fall.

Mr. McISAAC. If I might just add as a rejoinder, what we have been dealing with in this program over the past 6 to 8 months—and perhaps I could elicit some of your understanding about that—is not a situation where we have been attempting to mislead the Congress or this committee. We have been trying to get on top of a program schedule and program cost control in a program that was being pushed by me because we thought it was in the national interest.

We were trying to get on top of this during a period of rapid ramp-up of oil fill so that we found ourselves in a mode of constant correction. We found slippages, for example. Joe has been talking about slippages in brine disposal. We found slippages in pipeline construction, we found delays, for example, in getting started on the Weeks Island mine. We found delays occurring in terms of getting started with brine disposal from Bryan Mound. We had to constantly reestimate both schedules and then we would try to reestimate costs.

In that light, we have been trying to keep the committee informed after we got informed and after we went to the Secretary of Energy and after he got informed, and what was happening here is each time we would come up to the committee—think of this as a ratcheting mechanism—with a previous set of facts, we are already working on the next set of facts trying to get out ahead of this problem of slippage. So I would like to just point that out, sir.

Mr. BARRETT. On August 25 did the New Orleans office advise Washington that the fill rate was only going to be 107 million barrels to the end of the year?

Mr. MAZUR. That was our best judgment at the time. We had not brought on the majority of our brine disposal wells. We were pretty much in the mode of disposal at Bryan Mound.

Mr. BARRETT. At this point your fill was estimated at 125 million for the year and what you were doing was decreasing it to 107 million?

Mr. MAZUR. From the overall, we had experienced some delays in getting pipelines opened and delays in completing some of the brine disposal. But what we had not done yet was to bring the main systems onto line toward the 100 million-plus objective.

Mr. BARRETT. Did your estimates ever exceed 107 million?

Mr. MAZUR. At the very beginning we did.

Mr. BARRETT. By August 25 you had lowered your estimate to 107 million. At the same time, the committee was given a letter on October 4 saying it was going to be 114 million.

Mr. MAZUR. Well, the 107 million is the amount that was not in the transshipment. I think the 114 million was a combination of the 107 million plus 7 million terminal storage, transshipment, pipelines, and so forth.

Mr. GORE. Will counsel yield on that point?

Are you saying that the 107 million did not include those other items and was not intended to include those other items?

Mr. MAZUR. It did not include the oil that would be stored in our above-ground tanks or in transshipment, that is correct. At that time, 107 million was the best projection based on where we were in construction, what we could see going in the ground.

Mr. LANGENKAMP. If you will refer to attachment 1 of the letter written October 4, signed by C. N. Mitchell, Acting Comptroller, you will see that he calculates the fill at 107 million, with 7 million for tanks and pipelines. That is 35 million for Bryan Mound, 41 million for West Hackberry, and 31 million for Bayou Choctaw.

Mr. GORE. In fact, there are only 68—

Mr. MAZUR. One, at this time.

Mr. DINGELL. You said yearend would be 107?

Mr. LANGENKAMP. Mr. Barrett was making reference to the October 4 letter, and to the fact that it projected 114 million barrels. That projection assumed—and you can see it in the attachment—7 million barrels in excess of what was in the caverns. That is what would be in tanks and what would be in the pipeline or in transit. That is merely an attempt to reconcile the 107 million projection and the 114 million projection which was in the written letter.

Mr. BARRETT. And 3 days later I believe Mr. McIsaac testified that it was—I am sorry—who testified in Louisiana on the 7th? The figure on October 7 was reduced to 90 to 100 million.

Mr. McISAAC. I sent a letter, Mr. Barrett, to the chairman of this committee, and I believe it was on October 13, in which we have given a new estimate, which stated 90 to 100 million.

Remember, there is a lagtime; it is unfortunate, but there is a lagtime between submission and informing the committee. The letter of October 4 would probably have been forwarded or at least staffed out and cleared sometime in late September.

The letter of October 13 would have been cleared through the Department October 10 or so on each of these reductions in fill estimates starting from 125 million barrels back in the March arena, down to 114 million barrels on the reprogramming action submission, down to 90 to 100 million barrels—in my letter to the chairman of this committee on October 13 I reflected the constant changes in estimates which we were making based on experience, based on our deadlines on this being missed. We missed a deadline on the West Hackberry pipeline completion by something like 6 weeks.

We, also in retrospect, were overly optimistic that we could get a short-term solution to these brine disposal problems. Even in that letter of October 13 I was making the assumption that our brine disposal problem were amenable to resolution. That is, the average of 12,000 barrels a day per well could be jacked up on the basis of some of the actions we were taking to clean out brine wells and to add filtration systems to brine wells and so on.

We have found, after taking these actions, we have a fundamental problem with brine disposal. We therefore constructed in that October period a rather massive team, an effort, bringing the best technologists on brine disposal we could find in this country together. For example, we found some people at the Livermore Laboratory, which is in the atomic side of the Department of Energy, that know a great deal about brine disposal. So we brought them in and they are working full time with Don Mazur's team.

The point I would make is that we were shooting at that time at a very fast-moving target. We had no intention of not informing the committee of events as they unfolded on us, and we tried to keep the committee informed nearly as rapidly as we ourselves were recognizing the situation being formed.

Mr. BARRETT. The October 7 testimony was submitted to the Office of Management and Budget sometime prior to that for clearance, and it comes very close to the October 4 letter. Doesn't OMB clear your testimony?

Mr. MAZUR. I don't know what testimony you refer to. I think the 90 million to 100 million figure was the figure in Mr. McIsaac's letter of October 14. The previous figure was the 114 million in Mr. Mitchell's letter to Mr. Langenkamp.

Mr. BARRETT. Would you like to interrupt my questioning at this time, Mr. Chairman?

Mr. GORE. Mr. McIsaac, in your statement you say your estimates—when you testified before—were intentionally ambitious. We have to rely on accurate information in order to set budget ceilings and authorize funding.

I guess my question is: Is that an appropriate stand to take, and can we get some kind of assurance from you in the future, that we can be as up to date with the estimates as possible rather than being intentionally ambitious?

Mr. McISAAC. Let me deal with your first point. We were intentionally ambitious, but yet we were in a mode where it was technically possible. We were looking at a circumstance where every one of us who was involved agreed up to a certain point when events outran us that if things ran our way that was doable; and, of course, being driven by the events which are now becoming evident

not only with the petroleum price increase announced this weekend but also the continuing circumstance in Iran, which takes up to 6 million barrels a day potentially off the world market, 500,000 barrels a day of imported oil away from the United States, being driven by that kind of concern, we didn't want to interfere in any way with our potential for achieving oil storage in this country as quickly as possible.

By "any way," I mean any lack of pressure on ourselves, most importantly, any lack of attention within the Department of Energy to our problems and the resolution of those problems, and any lack of funding support of the Congress—and it is my belief, as these scheduled adjustments were made in 1977 by the FEA, that these points were indeed discussed with the Congress—and the Congress agreed with us that we should go as hard as we could toward the oil fill.

We have now in retrospect seen that the situation in the filling of caverns is not as amenable to our schedule concerns and our pressures on ourselves as we would have hoped. We came up against technical reality. Unfortunately, most of the technical reality has been faced by us in the last few months as we got into the very, very rapid ramp-up stage.

With regard to the assurances in the future, I would like to ask General DeLuca to address himself to this point. He came into this program in July; he is a program director; he is a very effective program director; he has a great deal of experience in running very important programs for this Nation.

I might add, General DeLuca did not need this job and General DeLuca is performing a very important service for us in the Department of Energy and for you, I think, for this committee, and for this country.

Joe, would you like to address yourself to this?

Mr. DELUCA. Coming back to the chairman's statement and yours, Mr. Gore, I would like to put some caveats on our performance in the future.

As far as the turnkey is concerned, we will defer to your judgment when we come in August with our matrix analysis, with all the data. I think you will give us that chance.

I would like to say on the reprogramming, to go ahead with the 280 million barrels expansion—we will do the 248 million barrels of existing capacity. There are some unknowns in there, some technology unknowns. These are the very leach-fill concept we are using.

Mr. GORE. I thought you said—if I might interrupt in defense of the turnkey approach—that we were not pushing the state of the art here?

Mr. DELUCA. I am saying that on the turnkey we will come to you with the technical data and let you see what that is. Just so we know the schedule on the expansion—we developed that—as we work 6 or 7 years and get into these salt domes and start leaching, things happen. That is all I am trying to say. We have to be sure we have the water volume to push the fluid dynamics to be able to leach. We don't know that yet; we have to go get that.

The withdrawal engineering is something, sir, that we have not done; it has to be done.

All I am trying to do is to have this.

The thing we need most, Mr. Gore, in this program now is not so much program planning as systems management, systems engineering, withdrawal engineering, systems integration. If we proceed with all of these sites and caverns—remember, in the present business of 248 million barrels there are 16 caverns and 2 tiers of mines. Here there are going to be 28 more caverns; there are going to be 3 sites in this turnkey. This all has to be integrated, and that engineering we do not have.

Don Mazur, my working colleague, Deputy Program Director, so to speak, he doesn't have that capacity and capability in New Orleans. The program is underengineered for the future.

Mr. GORE. Mr. McIsaac, you and I went through this in detail in the March hearing, year by year, how many million barrels each year, and I expressed my reservations about it at that time. We are going to have 68 million at the end of this year, rather than 125 as you said at that time. You said that we would complete the first 250 million by the end of the June 1979, period.

At what date do you now think we will complete the first 250 million?

Mr. McISAAC. I believe the first 250 million will be completed in early 1980, May, June 1980. But, again, this is a decision which will be reported, based on funding levels and other matters.

Mr. DeLUCA. Monthly and quarterly we will report. May is the date right now.

Mr. GORE. Within a year?

Mr. DeLUCA. I would say a year and a half, from the original scheduling.

Mr. GORE. I am sure there is a logical explanation as to why we are buying sour instead of sweet. Could you supply that to us?

Mr. LANGENKAMP. Congressman Gore, the strategic petroleum research plan which was adopted by both Houses of Congress, or acquiesced in by both Houses of Congress, went into great detail—and I have the page numbers marked here in the areas where it discusses the crude mix. In fact, they detailed five different types of crude and they don't merely limit themselves to sweet versus sour, but also the API gravity and other chemical characteristics. This was gone into; studies were done and the plan at that time—and there were no objections to it—provided for a 60-40 split between sour and sweet—the kind of mix that would most likely suffice in the event of an embargo, or some sort of supply interruption.

Mr. DINGELL. Which is sweet and which is sour, the 60 or the 40?

Mr. LANGENKAMP. The 60 percent is sour.

Mr. DINGELL. How much of that was to be high asphalt and how much would be low asphalt?

Mr. HYSTAD. We are talking about an Arabian light type of a sour which is a relatively high quality sour crude.

Mr. DINGELL. It would have to be low in asphalt?

Mr. HYSTAD. Yes; and it is relatively low in sulfur. We are talking about something less than 1.9 percent in sulfur content.

One of the bases for this conclusion was an analysis, a projection of what refiners would be using in 1980 and 1985, and what would be the likely interruptions during that time period, and what types

of oil would be interrupted; and the conclusion was that the most likely interruption was of the sour crudes, not sweet crudes.

We think we erred on the side of having more sweet than we might need, simply because sweet provides greater flexibility for refiners to use it.

Mr. DINGELL. The answer is that almost anybody can refine low sulfur sweet crude and only a few people can refine high sulfur crude, particularly if you get down toward the heavy gravity type.

Mr. HYSTAD. That is correct, but we are not storing that type of crude. For example, Alaskan crude does not meet our specifications for storage in SPR, nor do many, many other heavier crudes.

Mr. DINGELL. How about Mexican?

Mr. HYSTAD. That meets the specification.

Mr. GORE. General DeLuca, you described the subcommittee's comparison of the events unfolding in this program with C-5A as untoward, and you say that the C-5A has its merits. You did not mean to imply that the contracting approach and the management of that contract has its merits, did you?

Mr. DELUCA. I would say in hindsight that the contracting approach for that type of a state-of-an-art weapon that had that high risk and high degree of uncertainty, to package all of that into one contract is not the problem. I am of that school, yes.

Mr. GORE. And then you went on to say what we are discussing here is not a C-5A-type project and that it is not that large and not pushing the state of the art; however, the total cost of this program is \$25 billion.

The component we are talking about as a turnkey is 472 million barrels' worth and I note on page 5 of your prepared statement—which I alluded to a moment ago—that you are indeed talking about pushing the state of the art. I will quote from your prepared statement: "New solution mine salt caverns will be developed through a procedure of leaching salt caverns and these new caverns will be filled with oil in increments as sufficient new volume is leased." This procedure is a technology not previously employed in the United States, although there has been experience on a smaller scale in Western Germany.

It seems that the comparison with the C-5A program in those two respects does indeed hold up. It is an enormous program and the state of the art is being pushed.

Mr. DELUCA. Sir, three points: First, the \$25 billion, if I can round the numbers—

Mr. GORE. I know that doesn't apply to the turnkey portion alone, but the size of the program—

Mr. DELUCA. Can I make the distinction?

Mr. GORE. Surely.

Mr. DELUCA. The \$25 billion, if we do the full billion barrel program, I would say at this time is \$22 billion for oil. That is a treasure, anytime. It is all oil, \$22 billion; \$3.5 billion would be construction, 1 billion barrels of cavern space at \$3.50 a barrel in round numbers.

You have to now get down to a program of \$3.5 billion.

Mr. GORE. Which is no small sum.

Mr. DELUCA. Which is a lot of money, yes, sir. We have that distinction.

The second distinction is, the C-5A was in an R.D.T. & E. mode as distinguished from what we are doing here, where this is a technology consideration of how you leach and how you fill as fast as possible. We know that you can leach; the point is whether you can leach the way we are trying to do it on an expeditious basis.

Here let me have John Scango, our chief engineer—

Mr. GORE. It is a new technology?

Mr. DELUCA. Not in the sense that you have to do a lot of R. & D.; it is a case of how fast you work it.

Mr. GORE. If you don't know how to make it work, it is a question of semantics, what is R. & D. or exploration?

Mr. DELUCA. Congressman Gore, if you and I could settle on the definition of, "research and development" and then "test" and so forth, we get to the technology, that is, working technology of leaching, where the process of leaching is well known. It is the concurrency; it is the pace; it is the acceleration that we are talking about. Once we have developed the sump, the chimney and the roof, and we start filling, we can fill so far and then we have to get this for our sonic calibrations and stop. We have built concurrently somewhere else, and we fill and come back here and rework. It is that kind of thing.

Mr. GORE. But the distinctions I really don't think are meaningful, for this reason: The fact that unknowns are involved, the fact that it has not been made to work previously, gives whatever contractor you chose the same kind of excuses that the contractor with the C-5A used in order to bilk the Government out of massive and unjustified cost overruns.

Mr. DELUCA. It is difficult for me to join you in your last two sentences. If you want to say there is a degree of scale here, I can readily agree. As to the degree of control, there is no bilking or that kind of thing. I repeat, if a site—you can get your mind and your hands and your engineers on top of it, you can ride abreast with them as to what they are doing, and when they are doing it. If you have the very things Ernie was talking about—performance tracks, schedule tracks, cost tracks, design change control—you stay with him.

Mr. GORE. All of which we have with the C-5A?

Mr. DELUCA. This is a smaller bite, sir; it is a cavern that you are working.

Mr. DINGELL. I am curious whether you are telling us this is almost routine work, or whether it is pressing existing technology to the state of the art. Now which is it?

Mr. DELUCA. I turn to my chief engineer.

Mr. DINGELL. Your name, sir?

Mr. SCANGO. John Scango, engineer with the Strategic Petroleum Reserve. What you are developing here are caverns which have been developed before by Dow, Allied, and many other corporations in this country and abroad. We are working with salt, which is well known to people around the world. The questions are, How fast do you leach and, how do you dispose of the brine?

Sizewise, we are working with caverns which are much larger than have been developed by others for storage. The Germans are working with caverns of about 3 million barrels; we are working with 10 million barrel caverns. Industry works with caverns typi-

cally of around 5 million barrels. We are dealing with technology essentially well defined. We are expanding faster and developing caverns which are larger but we have a base. We are working from a base. There is a lot of corporate knowledge and experience in this field.

Mr. GORE. It has been done in the United States before?

Mr. SCANGO. Oh, yes. For example, LOOP (Louisiana Offshore Oil Port) is doing it in Louisiana right now. We are in an emerging field, but there is a base of technology to work from. Our program is advancing the state of the art in time and cavern size.

Mr. GORE. I am here with a prepared statement that says it has not been previously employed in the United States. I don't want to belabor the point.

Mr. SCANGO. We are applying a different leaching technique than industry has applied in the United States, in order to do it more quickly. The basic technology of leaching is well known. We are leaching more quickly.

Mr. GORE. General DeLuca's statement says, "This procedure is a technology not previously employed in the United States."

Mr. SCANGO. The method by which we are developing caverns has not.

Mr. DELUCA. Perhaps I should have said "technique," sir.

Mr. GORE. Maybe it is a distinction that alludes me.

Mr. SCANGO. Let me expand one step further: We are proposing to leach a typical cavern with three wells, to do it more quickly, with higher early space yield. We get quick space to begin with, then we move the leaching strings within the cavern. Industry generally leaches with a single well. We are adapting our technique and we are also adopting the technique of filling above the space that we are leaching. Therefore, we have oil fill and we are leaching in a cavern at the same time.

This is not the standard way to do it. Industry in this country and abroad usually leaches the whole cavern and then fills it. Again, we get a higher yield.

If you can see what I am saying, we are working with a base of technology but we are pushing it, so to speak, to suit our needs.

Mr. GORE. OK. So, General DeLuca, in summary, your distinction between C-5A and this project is that you believe we will not run into the kinds of problems we ran into with the C-5A because this is relatively easy to do and is easier to monitor?

Mr. DELUCA. I do believe that; yes, sir.

Mr. GORE. I don't share your confidence in that, I guess. I tend to think the chairman is correct in his opening statement, that since we have invested the time and money to develop the expertise that these people have, it is probably the worst time to back away from that procedure.

Second, I think there is a good deal in the bureaucratic dynamics described by Mr. Fitzgerald earlier. In that light, I would like to ask you whether, in fact, it is true there was no comparative cost analysis performed prior to the selection of the turnkey option?

Mr. DELUCA. Sir, I would have to say there were no comparative costs, in the sense that one could produce an analysis and a study. We knew what it was costing us to do the first 250 million. We have projected what it is costing us to do the second 280 million.

Remembering that the first 250 million is not a leaching process as much as it is flushing out the brine that someone else has leached, OK? The second one is a leaching process and there we have preliminary and detailed design and cost estimates. So we know from what we are going to leach, by contractor, what it should cost—the point that Ernie made.

So then when we go to turnkey and we have the expertise of the petroleum, the chemical and the construction companies coming to us on a competitive basis, we can compare. So the comparison comes then.

Mr. DINGELL. Would you yield?

Mr. GORE. Surely.

Mr. DINGELL. Were there any cost information studies, or did you have cost information at hand, at the time you made the decision to go turnkey?

Mr. DELUCA. On the small turnkey, sir, we had two unsolicited proposals and two preliminary cost estimates.

Mr. DINGELL. Preliminary cost estimates?

Mr. DELUCA. Remember, they are unlimited proposals that have cost estimates in them that you can't hold a contractor to until you get down to negotiation; and then we had two Gulf-Interstate cost estimating documents.

Mr. DINGELL. Two Gulf-Interstate?

Mr. DELUCA. Gulf-Interstate was one of our engineering companies.

Mr. DINGELL. So those are essentially the engineering studies and the cost studies?

Mr. DELUCA. Yes. We have a knowledge of what it cost to do what we did. We have a knowledge of what it should cost to do what we are going to continue to do in our own leaching process. We have two unsolicited proposals and two engineering cost estimates, and so we feel we are pretty well equipped now to size what the turnkeys may offer.

Mr. DINGELL. You said presently well equipped?

Mr. DELUCA. Yes. It is difficult to know what they are going to propose until they propose it.

Mr. DINGELL. Was an option paper prepared on these matters?

Mr. DELUCA. Was an option paper prepared?

Mr. DINGELL. Yes.

Mr. DELUCA. There was an option paper prepared, sir, on the techniques of contracting, I would say.

Mr. DINGELL. On the techniques of contracting?

Mr. DELUCA. Yes.

Mr. DINGELL. Does that relate to costs?

Mr. RAUCH. A paper was prepared prescribing techniques of storage setting out the turnkey approach, looking at the way we were procuring in the earlier 250 million and examining courses of action in between. This was a subjective analysis of a management methodology for a procurement program, and a paper was prepared as a working document and could be made available.

Mr. DINGELL. Were there cost figures in this?

Mr. RAUCH. No, sir, it was a methodology paper.

Mr. DINGELL. There wasn't an option paper as regards costs?

Mr. DELUCA. No option paper was prepared as regards cost.

Mr. DINGELL. That is a little different from the impression we have been receiving up to now.

Mr. DELUCA. We know what it cost us to do the 250 million and how we did it. We have the detailed drawings and the cost estimates on the second phase of the program of 280 million barrels where we are going to do the leaching through contract, through design-construct contracts. We know that. We have on the T-3's, the three small turnkeys, as I said, two unsolicited proposals and two engineers' cost estimate documents. We feel we are well prepared to go into a technical-economic analysis with turnkey.

Mr. DINGELL. The committee staff, I am advised, requested this option paper last week, and we were told it was not available.

Mr. DELUCA. If you ask me for that option paper, you have got it. [The option paper referred to was received for the record.]



Department of Energy
Washington, D.C. 20461

INFORMATION MEMORANDUM

TO: Under Secretary

THRU: Assistant Secretary for Resource Applications

FROM: Director, Strategic Petroleum Reserve

SUBJECT: Turnkey Development of SPR Sites for Final
100-350 Million Barrels of Government Storage

Purpose

To provide the Under Secretary with recommendations for the turnkey development of new SPR storage sites.

Background

The SPR Program Director already has initiated activity for the expansion effort on three of the original sites, at West Hackberry, Bryan Mound and Bayou Choctaw, involved in the first SPR increment of 250 million barrels. This expansion effort will bring the storage capacity to approximately 570 million barrels. The SPR Program Director soon will be initiating discussions with appropriate corporate officers concerning storage sites at Napoleonville (30 million barrels of existing capacity), Cote Blanche (30 million barrels) and Ironton (20 million barrels). With this storage, a total of 650 million barrels would be available to the program. Although Congress has approved an objective of 1 billion barrels, OMB is still considering whether or not to finance expansion of the Government's storage program beyond the 750 million barrel capacity, in the FY 1980 budget. Thus at this time the program must plan for new storage sites with total capacity ranging from 100 to 350 million barrels (or up to 450 million barrels if for any reason the Napoleonville-Cote Blanche-Ironton discussions should not lead to additional storage). A decision on the ultimate funding and expansion decisions must be received prior to contractor selection under the proposed turnkey procurement, and the SPR Plan amended to apprise Congress of this turnkey selection methodology and to reflect the site decisions. However, even if funding for the

last 250 million barrels is not forthcoming, the turnkey solicitation could result in awards of contracts for 100 million, and conceivably as much as 200 million, barrels of storage.

Based on responses received from the private sector to an opportunity notice published in the Commerce Business Daily, it is obvious that ample potential storage space is available. Industry has responded favorably to the notion of developing new leached caverns and mines on a turnkey basis; this additional capacity provides an opportunity to meet or exceed the 1 billion barrel objective. The expressions of interest, however, were highly preliminary and undetailed as to the many specifics required for final selection and contractual award.

Thus, on September 25, 1978, the Under Secretary requested that an acquisition plan be developed for turnkey contractual arrangements for new sites. The total turnkey approach gives the responsibility to a prime contractor to acquire, develop and initially operate (including the injection of the oil into the caverns) a storage site in accordance with Government performance specifications. The acquisition plan was to provide for (a) evaluation of possible participation by the Corps of Engineers, (b) eligibility of Canadian storage, and (c) options for Government purchase of the crude oil by the turnkey contractors. The recommendations that follow have been developed by a task force operating pursuant to the SPR Program Director's guidance.

Discussion

In approaching the acquisition alternatives for turnkey contractors, several key criteria were developed to make the process responsive to management needs. These were:

- a. Maximize the competitive environment.
- b. Contract on a turnkey basis to maximum extent possible, minimizing Government involvement in day to day management operations.
- c. Place cost/schedule/performance responsibility on the private sector.
- d. Assure system compatibility.
- e. Preserve flexibility to lease as well as own the storage facility.

- f. Limit procurement process to six months or less.
- g. Preserve option to get offers in increments of storage between 20 and 350 million barrels.
- h. Consider only proposals whose accomplishment appears to be feasible within 1985 timeframe.
- i. Consider only proposals suitably located for SPR drawdown.
- j. Provide opportunity for maximum schedule acceleration.

With these criteria in mind several options were considered, from among which the following approach is recommended:

Two Step Negotiated Procurement.

The two step method provides for submission of unpriced technical proposals in response to a Request for Technical Proposals issued by the DOE in the first step. These technical proposals then are evaluated and discussions/negotiations conducted to determine which firms meet minimum technical requirements. Those determined to be technically acceptable then are issued a Request for Final Technical and Cost Proposals. Final selection and award would be primarily on the basis of, but not limited to, cost; schedule drawdown locational benefits, and other factors also would be considered. The two step process is outlined in detail in Attachment A. The schedule for this approach is included as Attachment B. In order to obtain maximum participation by industry in the two step turnkey solicitation it is planned to forward the draft statement of work included as Attachment C to industry for review and comment, and then to hold a presolicitation conference. Approximately two weeks will be required for this activity; however by involving industry in the development of the statement of work, it is expected that a much greater time saving will be realized in the proposal preparation and evaluation processes. Also, in order to assure that the total procurement process is accomplished in the minimum time, it is essential that a sufficient number of qualified people be assigned to the Government's evaluation and negotiation teams and relieved of other duties during critical periods. It may also be advisable to make information-gathering site visits early in the technical proposal evaluation period, and to include a knowledgeable A-E contractor having environmental expertise in all stages of the evaluation as an adviser.

In accordance with the Deputy Secretary's guidance, Canadian storage sites would be considered on the same basis as American sites, to the extent permitted by law. Attachment D discusses problems which may arise under the Buy American Act and Balance of Payments Program, but which appear to be soluble if appropriate Departmental determinations are made. The Deputy Secretary has suggested that an award for Canadian storage be conditioned on subsequent negotiation of a Government-to-Government agreement providing the U.S. with requisite assurances concerning site development and drawdown, and on Congressional approval. The SPR Program Director believes that, as a condition of contract award for Canadian storage, this Government-to-Government agreement should contain in effect a Canadian Government guarantee of the commercial contract.

In response to other policy questions which were raised at the September 25, 1978, meeting it is recommended:

- That the use of the Corps of Engineers to manage new site development only be considered if the total turnkey approach does not succeed in providing the SPR with its needed storage capacity and that in such event the Corps should be given a specific site for development (see Attachment E);
- That the turnkey offerors be allowed to offer on an option to sell crude oil to the Government and transport it to the storage site on a fixed price basis, although attractive offers are not thought likely (see Attachment F);
- That offers of domestic as well as imported oil should be permitted, without regard to entitlements issues, in anticipation that if the entitlements program is still in force when filled sites are delivered, contracts for imported oil will be modified to incorporate entitlements provisions, and contracts for "old" domestic oil will if necessary be offset by a regulatory change raising the Government's cost to the national average price (see Attachment G);
- That in accordance with advice from IA, foreign governments and firms will not be excluded from competition for the development or fill of U.S. sites; and

- That while the Government's preference is for ownership of facilities, consideration will be given to lease arrangements for not less than 15 years. (Note: No-year appropriations would be needed for a long-term lease.)

Compliance with the National Environmental Policy Act (NEPA) is the responsibility of the Federal Government, and while contractors can assist in environmental impact statement (EIS) preparation, DOE cannot delegate this responsibility. It would be a violation of NEPA to irrevocably commit to development of a U.S. site before there is a final EIS covering that site and assessing alternatives. Some of the sites which may be proposed for turnkey development are covered by final or draft DOE EISSs, many are not, and foreign storage stands on a different footing. As indicated by the discussion of this subject in Attachment H, careful planning will be necessary in order to minimize NEPA risks without delaying the development of storage or diluting the contractual advantages of a fixed price turnkey effort.

Attachments

ATTACHMENT A

SPR NEW SITE
 PROCUREMENT STRATEGY
 (TWO-STEP NEGOTIATION)

KEY FEATURES

- o Applicable to procurement of complex technical items where available specifications are not sufficient to support formal advertising.
 - o Flexible system conducted in two phases:
 - Phase I - Request for, and the submission, evaluation, and if necessary, discussion of a technical proposal, without pricing, to determine the acceptability of the services offered. ~~Under this approach, "Technical" has a broad meaning and includes, among other things:~~
 - o Availability of an Acceptable Site
 - o Engineering Approach
 - o Special Processes
 - o Special Testing Techniques
 - o Technical Understanding
 - o Schedule
 - o System Interfaces
 - o Availability of Specialized Equipment
- Also, when required to clarify basic technical requirements, other related requirements such as the following may be pursued:
- o Management Approach
 - o Design/Construction Plans

- o Corporate Commitment
- o Experience of Key Personnel
- o Past Corporate Experience
- o Manpower Resource Capabilities

Phase II - Consists of issuing a Request for Price Proposal confined to those offerors who are determined to meet minimum technical thresholds under Phase I.

o Procedure

Step One:

- (a) Request for technical proposals is issued. The request may be in the form of a letter and shall contain, as a minimum, the following information:
- (1) The best practicable description of the services required.
 - (2) Notification of the intent to conduct the procurement in two steps and the actions involved.
 - (3) The requirements of the technical proposal, i.e., the necessary details such as drawings, data, presentation, etc., to be submitted.
 - (4) The criteria for evaluating the technical proposal (may include Management Approach, Special Processes (e.g., leach/fill), testing, etc.)
 - (5) A statement that the technical proposals will not include price or pricing information.

- (6) Due date for receipt of proposals.
 - (7) Statement that Government may discuss the technical aspects of the proposal with the concern submitting the proposal.
 - (8) A statement that in the second step only, successful step one proposers will be considered for award; and that each proposal in the second step must be based on the bidder's own technical proposal. Multiple awards may be made.
 - (9) Statement that sources submitting unacceptable technical proposals will be so notified upon completion of the technical evaluation.
 - (10) Statement relative to number of sites for which technical proposals may be considered.
- (b) Receipt and Evaluation of Technical Proposals:
- (1) Protect against disclosure.
 - (2) Remove all reference to cost.
 - (3) Evaluated based on criteria included in the request for technical proposal.
 - (4) Categorize proposals as acceptable or unacceptable
 - Reasonable effort shall be taken by the Government to bring proposals into acceptable range. On site visits may be made if necessary. Contracting officer to arrange for necessary discussions.

ATTACHMENT B

SCHEDULE - TWO STEP

<u>EVENT</u>	<u>DATE</u>	
- Issue draft statement of work to industry in preparation for presolicitation conference	<u>10/11/78</u>	
- Hold presolicitation conference (receive comments on draft statement of work)	<u>10/24/78</u>	
- Initiate two-step process		
Step I:		
1. Issue letter request for technical proposals	10/30/78	11/5
2. Receive technical proposals	12/4/78	1/8
3. Complete initial evaluation of technical proposals	12/18/78	1/2
4. Hold discussions with offerors as necessary	12/26/78-1/5/79	1/17
5. Receive updated technical proposals	1/10/79	2/10
6. Establish competitive range (i.e., final determination on acceptability of technical proposals)	1/15/79	2/10
Step II:		
1. Issue request for proposals to offerors in competitive range	1/12/79	2/10

<u>EVENT</u>	<u>DATE</u>
2. Receive proposals	3/30/79 2/2/79
3. Complete evaluations including written oral discussions if required (Based on 8/19/79)	4/30/79 3/2/79
4. SEB final report complete.	5/1/79 3/9/79
5. Presentation to Source Selection Official	5/1/79 3/19/79
6. Source(s) selected	5/1/79 3/21/79
7. Letter contract(s) awarded	6/1/79 4/13/79

} 30 days
 100 then

ATTACHMENT C**DRAFT**

STATEMENT OF WORK

"TURN KEY"

I. DESCRIPTION OF WORK

The contractor shall perform design, construction, operations and maintenance, and related functions for the development and fill of a crude oil storage complex with a useable capacity of at least 20 million barrels. The complex will include pipelines to a major crude oil distribution center and/or provide for terminals and docks as required for distribution to users during a petroleum supply interruption. The specific requirements and criteria are further defined in the following sections.

II. GENERAL WORK SCOPEMajor Contract Tasks

The following is a listing of the major tasks to be accomplished under this contract:

Land and/or existing facility acquisition.

Obtaining all required rights-of-way for utilities, roads, and pipelines necessary for operation of the complex and crude oil distribution.

Environmental impact statement preparation and/or revisions.

Archeological studies.

Obtain all necessary Federal, State, local permits and licenses necessary to carry out development, withdrawal and operation of the facility.

Topographic surveys, underwater surveys and soil testing.

Geological studies, e.g., salt characteristics, caprock configuration (as required).

Design and construct, as required.

Cavern piping which requires brine lines, fresh water lines and oil injection and recovery lines.

Cavern wells, casing installation and wellheads, hydrostatic tests and connections to distribution piping system.

Pumping facilities for oil, fresh water and brine.

Instrumentation and measurement systems as required, such as flow meters, recorders and temperature and pressure indicators.

Site power distribution lines from substations to be located on complexes by power companies.

Buildings as required for pumps, instrumentation, offices, warehouses, laboratories, maintenance and other support facilities.

Brine and fresh water ponds.

Necessary site security systems.

Pipelines from the raw water and crude oil supply sources.

Raw water intake structure with suitable pumping facilities.

Brine disposal systems, such as disposal wells and pipelines to the Gulf of Mexico as required, and associated pumping systems.

Oil storage tankage, supply pumps metering, docks as required at existing or new complexes.

Fire protection systems.

Vapor recovery and inerting systems.

Fresh water and sewage disposal and other sanitary systems as required.

Site common construction support facilities, including roads.

Mine conversion, if appropriate.

Provisions for accountability and security of the reserve.

Arrangements for or design and construct docks and/or terminals as required.

Maintenance and operation, including drawdown capability of the reserve for a minimum of five (5) years from date of completion of initial fill (optional).

III. PERIOD OF PERFORMANCE

The contractor's performance period is not expected to extend beyond 1985 for completion of fill. Interim storage goals will be established, based on specific sites selected. The contractor should provide an oil in-the storage schedule.

IV. GENERAL CRITERIA

The following are general criteria with which the contractor must comply:

Health and Safety

The contractor shall comply with all applicable health and safety standards, specifications and

codes developed and published by the following organizations:

American National Standards Institutes, Inc. and United States Government Safety and Health Regulations, e.g., Occupational Safety and Health Act (P.L. 95-596). In the event of a conflict between the above standards, the more stringent shall apply.

Codes and Standards

The contractor shall comply with all applicable codes and standards such as API, ISA, ASTM, NEPA, NFPA, AMSI, etc.

Environmental Considerations

The storage facility shall meet all applicable environmental requirements provided for by law. The facility shall be subject to the requirements of, and shall comply with, the National Environmental Policy Act; the Clean Air Act; the Federal Water Pollution Control Act; the Rivers and Harbors Act of 1899; the Safe Drinking Water Act; the Toxic Substances Control Act; the Resource Conservation and Recovery Act; the Noise Control Act; the Coastal Zone Management Act; the Endangered Species Act; the Fish and Wildlife Coordination Act; the Marine Protection, Research, and Sanctuaries Act;

and all other Federal, State and/or local requirements, administrative authority, and process and sanction which relate to environmental protection and which are applicable to the SPR under Federal laws including, but not limited to, those enumerated above. Particular attention must be given to acquisition of all required environmental permits, licenses and approvals.

National Environmental Policy Act Compliance

Full compliance with the National Environmental Policy Act and the DOE's regulations implementing that Act (10 CFR Parts 208, 711 and 1021) shall be insured, including appropriate consideration to the environmental effects of proposed actions and the preparation of detailed environmental impact reports.

Fluid Test and Analysis

The contractor shall be responsible for conducting all fluid tests and analyses required during construction and fill of the complex, including the following:

Crude Oil Inspection and Comprehensive Analysis Services

The contractor shall provide for obtaining the following inspection and comprehensive analyses of crude oil samples collected as part of the quality assessment program during fill operations:

Inspection Analyses

<u>Test</u>	<u>ASTM Method</u>
Water	D 95
Sediment	D 473
Density, Specific Gravity or API Gravity	D 1298
Pour Point	D 97
Total Sulfur	D 1552
Salt Content	D 3230
Viscosity	D 445
Neutralization Number	D 664
Vapor Pressure	D 323

Comprehensive Analyses

- Gas chromatography of whole oil;
- Infrared spectroscopy of whole oil;
- Atomic absorption analysis for certain trace metals; and
- Simulated distillation of whole oil or True boiling point distillation to 1070 F.

Brine and Water Analysis

The contractor shall provide for the comprehensive analysis of brine and raw water samples. This task will require periodic sampling from surface locations only.

The following components will be determined for each sample as directed by DOE:

Chloride	Iron
Bicarbonate	Potassium
Carbonate	Strontium
Sulfate	Barium
Hydroxyl	Specific Gravity
Sodium	Total Dissolved Solids
Calcium	Total Suspended Solids
Magnesium	PH

In addition, the following trace metals will be determined for selected samples:

Cadmium	Manganese
Chromium	Mercury
Copper	Nickel
Lead	Zinc

Human Factors

All facilities and equipment to be incorporated in the SPR are to be designed such that they may be operated manually in the event of emergency or control malfunctions and shall recognize the limitations of the human operator physically and mentally. There shall be consideration given to the employment of handicapped individuals in the design of facilities for system support and structures.

V. FUNCTIONAL CRITERIA

Capacity

Useable capacity of at least twenty (20) million barrels is required at each geographic location.

Location

The storage complex shall be physically connected to a crude distribution facility to effect fill, drawdown and refill. Such distribution facility may be a major crude pipeline system and/or marine facilities capable of accommodating tankers with

150 ft. beam, 950 ft. LOA and 40 ft. draft at a minimum. The contractor shall be responsible for accomplishing the connection(s) to the distribution facility(s). The distribution facility selected by the contractor shall have available thruput capacity to effect fill, withdrawal, and refill operations. In the event a distribution facility does not exist, the contractor shall provide a means to accomplish fill, withdrawal and refill.

Fill

The contractor shall cause the storage to be filled to its design capacity as soon as possible, but no later than December 31, 1985. Oil shall be provided by the DOE.

Internal Cycling

The storage system shall be capable of internal cycling, that is, transferring oil from any one storage vessel to any other storage vessel (if more than one exist at the complex) during the site standby mode and exercising all process fluid systems.

Drawdown

The storage complex shall be capable of being drawn down as soon as possible, but no later than six months after commencement of fill. The storage volume shall

be capable of being completely drawn down within a 150 day period. In this regard, the crude distribution facility selected by the contractor shall also have the capability to distribute the crude from the storage complex within the same 150 days. The storage system shall have the capability of being totally drawn down a minimum of five times.

Refill

The storage system shall have the capability of being refilled a minimum of four times after total drawdown. The distribution facility connected to the storage complex shall also have the capability of receiving the crude to accomplish the required refill. The storage system shall have the capability of being refilled to the original volume in 1000 days.

Instrumentation, Measurement and Control

Instrumentation and Control

The control system shall provided with full operational control of all fluid transfer and custodial functions from a centralized location at the complex. This shall be construed to mean that any movement of fluid within the zone in question shall be monitored from and controlled by a central console located at the complex.

Data processing will be utilized in the control system permitting operational instruction input (with operator lockout), and sufficient capacity for inclusion of any strapping tables for site tankage, provide temperature corrected inventory readout, sequential operations programming, alarm scanning and reaction, preselected level alarm programming of interim alarm capability during inventory change operations and authorized status change alarm when monitoring system.

In addition to the above, the system shall provide for the capability of data retrieval on a recall basis through use of a data logging type system (with operator lockout).

All controls, status indicators, data acquisition and alarm shutdown functions will be provided in a main control room having a semigraphic panel and operators console. The semigraphic panel will provide status indicators lights, properly located and identified on the panel flow lines, for all critical valves and pumps, and have change of status alarms.

The annunciator(s) for all alarms and shutdowns will be located so as to be easily observed from the operators console and provide with "Test," "Acknow-

lege," and "Reset" buttons accessible on the console. The annunciator(s) will be provided with "first out" capability so that the shutdown devices will have an alarm set to provide a warning in advance of the shutdown for appropriate action. Manual reset devices will be provided to prevent inadvertent operation of equipment after shutdown.

Motor operated valves, other than control valves, will be capable of manual operation. A local flow indicator will be provided for all flow control valves.

Time delay relays in shutdown circuits, such as low flow and low suction pressure switches on pumps, will be provided. Anti-windup for controllers which may be in a standby mode, such as minimum flow, will also be provided.

An information and data storage retrieval system, with both supervisory and control capabilities, will be provided. Sufficient capacity will be available to store all pertinent data from the terminal/storage site complex and having adequate spare capacity for any future enlargement or addition to the facility. Necessary information will be available for retrieval intrasite, intersite and at the DOE Operations Center in New Orleans.

High and low pressure alarms on tubing and casing at each well to warn of changes outside the desired pressure range in either direction will be provided.

Pumps designed for series operation will be provided with shutdown system which shuts down all pumps operating in series, if any one goes down.

Control, Monitoring and Instrumentation Interface with Marine Terminal Operations

Since the terminal and storage site operations are separated by the required length of pipeline, the coordination of these operations must be insured by providing all necessary data exchange, control functions and electronic data system (EDS) safe and trouble-free operations.

The site and terminal will have graphic display of equipment and valve status on their respective systems. Sequence interlocking of valves and equipment suitable for both fill and withdrawal operations will be provided for the whole system. EDS systems at each end will be integrated so as to provide a safe overall response to EDS actuation from either end.

Overall Systems Command and Control

All complexes will be linked to the Project Office Command and Control Center in New Orleans, La. This Center will be the central location where fill and

drawdown operations will be controlled and monitored. The specific functions the Center will perform will be:

- 24-hour operation of all communications and computer equipment directly related to the operation of the sites.
- daily monitoring of site and complex operational control systems and status boards.
- execution of the DOE Fill Plan.
- execution of the DOE Drawdown Plan.
- simulation exercises to test the system as directed by DOE.
- DOE project management status/situation report.
- Crises Response Center for oil spills, fires, security breaches, and site scheduling and operational problems.

Measurement System

An oil measurement system will be required at each point of custody transfer between a Government and non-Government oil handling facility. The type of measurement system, as well as its accuracy and reliability, shall conform to all applicable petroleum industry standards and Federal regulations,

except as otherwise specified herein. Custody transfer metering shall be guaranteed accurate to within plus or minus 0.25 percent. Underground mines and caverns used for oil storage shall be equipped with meters accurate to within plus or minus one (1) percent. Manufactured oil storage tankage shall be strapped and the DOE provided with strapping tables with 0.25 percent accuracy. All meters shall have automatic digital readouts for flow rate and totalizing, which can be read remotely at the complex control center.

Utilities

All utility services and systems (e.g., electric power, water, sewage treatment/disposal, telephone/telex, etc.) necessary to maintain and operate the site shall be furnished. Utilities shall be available for the planned life of the complex.

Fire Protection

The facility shall have applicable fire fighting equipment and/or system consistent with protection standards, specifications, codes and regulations promulgated by the National Fire Protection Association and all governmental agencies having jurisdiction over same. Fire protection equipment and facilities shall take into the account the

proximity of the facility to public fire protection agencies, e.g., response time, available water supply, level of competence of the agency and its equipment. The system shall be operational at commencement of oil fill.

Petroleum Types and Characteristics

One or more of the following crude types will be stored in the facility covered by this contract:

SPR SPECIFICATION REQUIREMENTS

<u>Characteristic</u>	<u>DOE Crude Oil Type (Category)</u>				
	I	II	III	IV	V
API Gravity (API)	31-36	40-45	30-36	34-40	36-41
Sulfur (WT%)(Max)	1.80	0.25	0.50	0.25	0.50
Pour Point (F)(Max)	30	50	50	50	50
Salt Content (Lbs/1000 Bbls) (Max)	50	50	50	50	50
Viscosity (SUS @ 60)(Max)	150	150	150	150	150
Vapor Pressure (Lbs @ 100 F) (Max)	11	11	11	11	11
Mercaptans (PPM in 375 -500 F fraction)(Max)	no limit	12	12	12	no limit
BS&W (% Vol)(Max)	1.0	1.0	1.0	1.0	1.0
Yields (Vol %)					
Naphtha (375 F)	24-30	35-42	21-29	29-36	30-38
Distillate (735 F-620 F)	17-31	21-35	23-37	31-45	19-33
Gas Oil (620 F-1050 F)	26-40	20-34	28-42	20-34	23-37
Residual (1050 F+)	10-17	4-9	7-14	0-5	7-14

The contractor shall design the storage system and equipment to accommodate the most demanding characteristics of the above oil types.

System Redundancy

System redundancy will be required for equipment or systems which are subject to a high probability of failure or malfunction.

Vapor Recovery and Inerting System

Conventionally mined storage vessels shall be equipped with functional vapor recovery systems. An inert gas system shall be provided to reduce the oxygen concentration in the mine to eliminate the potential of hydrocarbon explosions.

On-Site Testing and Laboratory Facilities

The contractor shall provide facilities and equipment in order that the following tests may be conducted at the storage complex:

Crude Oil

- ASTM D- 96 - Water and sediment in crude oils.
 ASTM D-287 - API Gravity of crude petroleum and petroleum products (hydrometer method).

Brine

Density	Temperature
Pit	Total Suspended Solids

Oil and Brine Monitoring

The contractor shall provide for the content of oil-in-brine discharged from surface ponds or

or tankage to the disposal system to be monitored. An in-line non-dispersive ultraviolet fluorescence spectrophotometer will be used to continuously and automatically monitor the oil content of the brine.

Sample Storage

The contractor shall provide for a repository for samples of crude oil, brine and fresh water.

Oil Storage Vessel Certification

The contractor shall develop a program for certifying each oil storage vessel. The program shall include the criteria in the following sections as a minimum and any additional tests deemed appropriate by the contractor. Prior to storing oil in the vessels, the contractor shall deliver a complete certified copy of all test results. In addition, the contractor shall provide a statement certifying that the vessel is suitable for storage of crude oil for a minimum of 20 years.

Criteria for the Certification of Existing Solution Caverns for Integrity and Usability

Integrity

The basic assumption is that if the cavern shall withstand a specified hydrostatic test such that no stored product will leakage from the cavern.

Primary Criteria

Test point shall be the casing seat of the final cemented casing string.

The magnitude of the test pressure shall be 0.9 psi/ft times the height of the overburden above the test point.

Acceptable test shall be no more than 10 psig pressure drop in a continuous 24-hour period.

There shall be no waivers on this test.

Secondary Criteria

All bore holes entering the cavern shall have a new casing string of appropriate weight and grade run and cemented in them.

For existing caverns, there shall be a minimum length of competent ^{1/} cement sheath behind the final cemented casing string. ^{2/}

-
- 1/ "Competent" shall mean the qualitative judgment that bonding is "acceptable" as based on a Cement Bond Log or equivalent survey. "Excellent" or "Good" shall be given a value of 1.0 ft/ft; fair 0.8; poor 0.25.
- 2/ If the casing seat depth of the new string is less than that of the original final cemented casing string, cementation of the latter shall govern. If the new string has a deeper casing seat, the quality and length of its cementation below the original casing string shall be additive to the latter.

	<u>Casing Size (Inches)</u>	<u>Length of Sheath -(Feet)</u>
Original Casing	16	300
	13-3/8	250
	10-3/4	200
	9-5/8	150
New Casing	16	500
	13-3/8	450
	10-3/4	400
	9-5/8	300

Requirements

All bore holes entering the cavern shall be equipped with a new wellhead having a working pressure of at least 1.5 that of the maximum operating pressure which will be exerted on it at ground level.

There shall be a minimum of 200 feet of salt between the cavern ceiling and the nearest zone of porosity and permeability above that point.

There shall be a minimum of 300 feet of salt between the cavern sidewall and the nearest edge of the salt dome (plug).

There shall be a minimum of 200 feet of salt web between adjacent cavern sidewalls.

This rule does not apply to coalesced caverns.

This rule may be waived if similar products are stored in the adjacent cavern.

This rule may be modified if a limitation is placed on number of cycles of freshwater displacement.

Usability

A sonar caliper shall be run in each cavern. The accuracy of the sonar caliper for determining cavern capacity and configuration shall be deemed as adequate.

The cavern ceiling and/or sidewall irregularities (traps) shall not have volumes in excess of 1-1/2% of the stored volume. This rule may be waived if reentry bore holes penetrate trap areas which reduces same to 3% of stored volume.

The ratio of the maximum ceiling lateral diameter divided by the salt web thickness between adjacent caverns at that same elevation shall not be less than 0.5.

If the salt thickness between the ceiling of the cavern is 500 feet or more, this rule may be waived.

If either chamber vertical height is as much or more than 2.0 times the other, this rule may be waived.

An azimuth and deviation survey shall be run on all bore holes to establish the vertical base point fulcrum of the sonar caliper.

Detailed analysis of the stability of the cavern through the projected enlargement through five drawdown cycles shall be conducted by qualified geotechnical engineers to the best available technology.

Criteria for the Certification of Existing Dry Mined Storage Chambers for Integrity and Usability

Integrity

The basic criteria for establishing the integrity of mined storage chambers in rock formations containing laminations, fissures, fractures or porosity and permeability shall be:

That the mined chambers are surrounded on all sides by ground water bearing formations and that there is evidence this ground water is actually entering the mine. If the latter does not apply, it must be confirmed that an impermeable formation is preventing ground water entry.

That the rock and overburden above it contain ground water having a head equal to or greater than 1.3 times the maximum operating pressure in the vapor space of the mine.

The basic criteria for the integrity of mined storage chambers in salt formations is:

The mass of documented evidence that domal salt has negligible porosity and permeability. This shall be confirmed for a specific mine by in situ and laboratory tests of any zones that are suspected to be permeable as a result of visual inspection. Since zones shall be considered significant only when they can be shown to be continuous between adjacent rooms in the mine and when their continuity between the mine and the edge of the dome on adjacent openings not used for oil storage cannot be disproven.

The outermost extremities of a salt mine shall be no closer than 300 feet to the edge of the salt dome.

Usability

The basic criteria for usability in mechanically mined storage chambers is the projected stability of the mined openings over the period of use as a storage cavern. Stability shall be judged in terms of the ability of the mine and shafts (with additional artificial support if necessary) to resist major failures of the roof or pillars that could result in loss of stored product, interference with the operation of the storage facility, disruption to adjacent surface or underground facilities. Minor stability problems will not necessarily be taken to render the mine unsuitable for storage purposes.

Stability shall be judged in terms of:

Detailed visual inspections of the present condition of the mine workings to locate previous stability problems and geological features that will influence future stability.

Detailed analysis of the stability of the mine and shafts by qualified geotechnical engineers according to the best available technology. Analysis must indicate a satisfactory factor of safety against failure to each pillar, for the mine roof, and for the shafts, both for the present condition and for future operating conditions. Special attention shall be given to areas deemed critical by virtue of unusual mine configuration or geological conditions.

The general configuration of the mechanically mined storage chambers can be modified in regard to floor and ceiling traps by additional works. These factors as they relate to usability are not considered to be pertinent.

Site and System Support Structures

Facilities will be provided to include administrative, control, laboratory, warehouse, garage, etc. building(s) to support the storage complex and work force required

during fill, standby and drawdown phases. The facilities shall be designed for a minimum twenty (20) year life cycle in the particular geographic environment. Some specific requirements are:

Size of the buildings shall be as required to house anticipated personnel and equipment in accordance with industry practice, applicable building codes and OSHA.

Buildings which house electrical, instrumentation and/or supervisory control shall be equipped with heating, ventilating and air conditioning equipment. The appropriate thermal insulation requirements ("U" factors for roof, wall and geographical area) shall be provided.

HVAC equipment shall be provided to maintain relative humidity at 60% maximum and a temperature of 60 - 80 F complete with temperature controls and heating elements, sized for comfort heating of personnel spaces.

Buildings shall be provided complete with electrical lighting, heating, plumbing, bulkheads for external entries of conduits, instrumentation tubing, etc.

Buildings shall be weatherstripped, caulked, junction of walls and roof sealed against air leakage so that HVAC equipment can be utilized efficiently.

Buildings which have pumps, engines or other heavy equipment shall be equipped with overhead crane or monorail.

Warehouse/maintenance buildings shall be heated; a limited space for office and sanitary facilities shall be heated and air conditioned.

Building having both occupied and non-occupied areas shall have zoned conditioning systems to promote energy efficiency.

Storage Complex Security

Industrial type security, i.e., fences, lights, etc., are required during construction, fill and operations.

Surge Facilities

The contractor shall provide surge pits or tankage for oil, brine and water systems adequate to meet requirements for fill, drawdown and refill. Above-ground oil storage tanks shall be double seal, floating roof construction.

Land Transfer

The Government prefers that land incidental to the storage complex operation be transferred as follows:

Storage and Plant Areas	-	in fee
Surface Brine Disposal Areas	-	in fee
Subterranean Brine Disposal Areas	-	with perpetual disposal rights
Pipelines	-	with perpetual easements

The rights to all easements and rights-of-way required to and between the storage, plant and other complexes shall be transferred to the Government.

Lease arrangements on storage, plant and brine disposal areas is an alternate which will be considered by the Government.

VI. Definitions

For the purpose of this work scope, the following definition of terms will apply:

DOE - Department of Energy. The DOE organizational chart is shown at Appendix ___.

SPR - Strategic Petroleum Reserve

GROUP - Major oil storage complexes within a general geographic area connected to a common distribution complex (marine terminal and/or crude oil distribution pipelines). The SPR currently has three Groups: Capline, Texoma, and Seaway. The Groups are named after the major interstate crude oil distribution

pipeline by which crude oil will be distributed for all storage complexes within the Groups.

COMPLEX - Major self-contained oil storage facilities, or, a marine terminal facility at a geographic location.

Oil Storage Complex consists of underground solution mined or conventionally-mined oil storage caverns in a single salt dome; related pipelines for raw water, brine and oil; permanent surface buildings and improvements; pumping stations; utilities, etc., e.g., West Hackberry Complex in Cameron Parish, Louisiana.

Marine Terminal Complex consists of tanker and/or barge docks, aboveground oil storage tanks; related pipelines; pumping stations; surface buildings and improvements; utilities; etc. at a specific geographic location, e.g., Sun Terminal Complex at Nederland, Texas.

SITE - Specific component or area within a complex such as a terminal, dock, cavern, mine, etc.

LEACHED SALT CAVERN - An area within an underground salt mass which has been excavated by the leaching process of injecting water into the salt and removing brine.

CONVENTIONAL MINE - An underground cavern which has been created by conventional dry mining techniques.

PIPELINE - The transmission pipe connecting one complex and/or sites to another.

PMO - DOE Project Management Office in New Orleans, Louisiana.

"PROJECT MANAGER" - Means the DOE representative heading the PMO who has overall project responsibility for construction and operation.

ENVIRONMENTAL PLAN - The plan to be furnished by DOE setting forth design criteria and construction procedures to assure that development of the SPR occurs in the most environmentally acceptable manner possible, consistent with the constraints of this program.

SPR PLAN - The overall concept in creating a petroleum reserve is provided in the SPR Plan submitted to Congress in February 1977. The SPR Plan with Amendments 1 and 2 thereto detail the status and the development of the Reserve.

FILL - The process of placing petroleum into permanent storage developed under this contract.

LEACH-FILL - The process of injecting raw water into a salt mass and removal of brine to create a cavity which is concurrently filled with oil.

STANDBY - The period of time following completion of development and fill of a complex to its specified capacity. The standby period continues until a drawdown occurs as a result of a crude oil supply interruption.

DRAWDOWN - That period of time during which crude oil and petroleum products are being supplied from the SPR to mitigate the effect of an interruption of imported crude oil and petroleum products to the United States.

REFILL - The process of placing petroleum into storage developed under this contract.

VII. DESCRIPTION OF EXISTING SPR FACILITIES

The DOE has planned for the initial 500 million barrels of crude for the SPR will be stored in leached caverns and conventional mines created in salt domes as well as other suitable subsurface mines. The project locations are as follows:

Capline Group

1. Bayou Choctaw Complex - Iberville Parish,
Louisiana Existing

Capacity	36 MMB
Expansion Capacity	40 MMB
Total	

2. Weeks Island Complex - Iberia Parish, Louisiana

Existing Capacity	75 MMB
Total	
	75 MMB

3. St. James Terminal Facility - St. James Parish,
Louisiana

4. Capline Terminal (Non-DOE) - St. James Parish,
Louisiana

Seaway Group

1. Bryan Mound Complex - Freeport, Texas

Existing Capacity	60 MMB
Expansion Capacity	120 MMB
Total	
	180 MMB

2. Seaway Terminal Facility (Non-DOE) - Freeport,
Texas

Texoma Group

1. West Hackberry Complex - Cameron Parish,
Louisiana

Existing Capacity	51 MMB
Expansion Capacity	160 MMB
Total	
	211 MMB

2. Sulphur Mines Complex - Calcasieu Parish,
Louisiana

Existing Capacity 22 MMB

Total 22 MMB

3. Sun Terminal Complex (Non-DOE) - Nederland,
Texas

The facilities for Bayou Choctaw, West Hackberry, Bryan Mound, Weeks Island, and St. James Terminal are under construction. Fill operations are being conducted at Bryan Mound, West Hackberry, and Bayou Choctaw. Additionally, the facilities at Sulphur Mines and the expansion of Payou Choctaw, West Hackberry, and Bryan Mound are under development. Locations currently being considered by SPRO and for which Environmental Impact Statements have not been completed are listed in Figure 1. Offerors are not precluded from using any of these proposed locations for purposes of this contract.

POTENTIAL STORAGE LOCATIONS

<u>GROUP</u>	<u>LOCATION</u>
Seaway	Allen Dome, Texas
	Daron Mound, Texas
	Nash Dome, Texas
	West Columbia, Texas
Texoma	Black Bayou, Louisiana
	Big Hill, Texas
	Vinton, Louisiana
Capline	Chacahoula, Louisiana
	Iberia, Louisiana
	Napoleonville, Louisiana
	Cote Blanche, Louisiana
	Weeks Island (Expansion), Louisiana

FIGURE 1

ATTACHMENT D

EFFECT OF THE BUY AMERICAN ACT AND THE BALANCE
OF PAYMENTS PROGRAM UPON THE CONSIDERATION OF FOREIGN
SITES IN THE PROPOSED SPR TURKEY PROCUREMENT

It is not entirely clear whether the Buy American Act (41 U.S.C. §§10a.-10d.) or the Balance of Payments Program (FPR Subpart 1-6.8) would preclude equal treatment of U.S. and foreign sites in a turnkey procurement of storage capacity. However, even if the procedures contained in these directives are determined to apply, their effect may be alleviated if appropriate Departmental determinations are made.

The Balance of Payments Program prescribes policies and procedures applicable to the procurement of articles, materials, supplies, and services for use outside the United States. There is some question, however, whether foreign construction projects are covered and further research is being done on this question. The Balance of Payments Program requires that, in the absence of adequate excess foreign currencies to pay for the foreign services, procurements should be restricted to U.S. end products and services unless the domestic cost is estimated to exceed the foreign cost by more than 50 percent of the foreign cost and the Secretary of the Department or his designee determines that the foreign product or service should be purchased. Foreign products and services may be purchased without regard to this restriction, however, if such action is required by a treaty or international agreement or if the products or services have been exempted by Departmental regulations. Accordingly, if foreign sites are to be considered on a par with domestic sites an international agreement should be drafted or regulations promulgated to waive the requirements of the Balance of Payments Program. It may suffice for an international agreement accomplishing this purpose to be entered into after a foreign site has been selected, but before a contract is awarded.

The Buy American Act, as implemented by Executive Order 10582, December 17, 1954, which was amended by Executive Order No. 11051, September 27, 1962, provides for a 6 or 12 percent factor to be added to the price, for evaluation purposes, of foreign bids for supplies or services (possibly including a storage contract) for use in the United States unless the Secretary of the Department determines that this

procedure would be inconsistent with the public interest. It could be argued that although a storage site was in a foreign country, the benefit of the service is enjoyed in the United States. It would be more logical, however, to consider the procurement as essentially a construction project (rather than as a service), which if located in a foreign country clearly is exempt from the coverage of the Act.

USE OF THE CORPS OF ENGINEERS TO MANAGE SPR CONSTRUCTION

Issue

Should the DOE use the Corps of Engineers (COE) for the development, fill, maintenance and operation of one or more new SPR storage sites and expansion of existing SPR sites?

Background

In the last several months SPRO has been considering alternative strategies for developing new sites required for the SPR. Alternatives which have been considered include: (1) a total turnkey approach, where the Government would solicit proposals for fully developed storage facilities; (2) use of a single design/construct firm to develop facilities at sites acquired by the USG; or (3) continuing to separate the design and construction management functions as is DOE's current practice.

In April 1978, the COE proposed to the DOE that it assume responsibility for design and construction management for one or more new SPR sites. Since April, SPRO staff have met on several occasions with COE staff to discuss options for COE management of a portion of the SPR development effort. In late August, COE staff presented a summary schedule for design, construction and fill of a specific site for the SPR.

COE has based its ability to do the job on its long history of managing large-scale, highly complex construction projects, while providing very little information on how they would manage an SPR project. Attachment 1 is a copy of a recent SPRO response to the COE regarding deficiencies in its August presentation.

Discussion

A complete turnkey contract directly with industry offers the greatest potential for meeting Program objectives while minimizing the Government's direct procurement and management role in developing the SPR. A private firm would have total responsibility for delivering fully developed storage facilities in accordance with performance specifications included in a competitive solicitation. This approach would maximize the application of industrial resources and capabilities to the SPR Program.

In discussions with SPR staff, COE representatives proposed a role for the Corps similar to the earlier SPRO approach to

managing site development. COE would assume management of the design and construction effort required at one or more sites acquired by DOE. It would use a large number of prime contracts for design, equipment and construction. COE did not include site operations and maintenance functions in its proposals to DOE, but is assumed that outside contractors would be used to perform these tasks under COE supervision.

The Corps has no better in-house technical capability to perform the detailed site design, construction or leaching of salt domes than DOE, and would rely on several A/E and construction contractors to actually undertake the work. In this capacity the COE's role would be that of a coordinator to assure integration of all components of the project to meet DOE's specifications. This management approach is clearly less than a total turnkey and leaves responsibility for many items, including program direction, permit acquisition and management of funds with DOE.

Even if a fixed price turnkey contract approach proves to be infeasible, there appear to be no clear advantages to using COE for development of new sites. By employing a private design-construction organization, the DOE could structure the contract to include incentives for the contractor to meet DOE's schedules and cost objectives, and the USG procurement workload would be minimized. COE management of the project would not reduce the USG procurement workload. Also, DOE could not offer incentives to the COE to encourage efficient implementation.

The COE would provide an additional management layer between DOE and the day-to-day technical project management, which would reduce DOE's involvement, but would not lessen its responsibility. Experience with the COE on real estate acquisition has shown that it is difficult to obtain status information from them and maintain necessary controls over cost and schedules. For this reason, it has been extremely difficult to hold the COE accountable for the project's progress.

If responsibility for directing the construction, operation and maintenance of all SPR expansion facilities was assigned to the COE, all actual program implementation would be handled by the Department of Defense, under DOE supervision. The Defense Fuel Supply Center (DFSC) currently is responsible for purchasing SPR crude oil, Military Sealift Command (MSC) for transporting this oil and COE for acquiring real estate

for SPR storage facilities and pipeline ROW. Should the COE be selected to complete SPR development, it would appear appropriate to transfer full programmatic responsibility to the DOD. That agency could then report directly to the Congress and the White House regarding its progress on the SPR Program.

DOE could retain responsibility for drawdown planning in accordance with national energy policy objectives, during a petroleum supply interruption. However, it might be difficult to coordinate these plans and requirements with the physical storage system being constructed under DOD management.

Discussion of Options

Option A: Inform the COE that we will consider using them only if we are unable to attract acceptable turnkey proposals from private industry.

- pro: 1. The COE would not necessarily be excluded from future participation in developing new SPR sites.
2. Would permit the DOE to consider private turnkey proposals which could offer clearly preferable development opportunities for the SPR.
3. Would not commit DOE to use the COE before alternatives have been explored.
- con: 1. If no acceptable turnkey proposals are received and a later decision is made to use the COE, would delay initiating development at new sites.
2. Selection of this option might not be acceptable to COE management. They may choose to forego the option of future consideration and possible selection.

Option B: Decide now to use the COE to manage the development, operation and maintenance of one new SPR site.

- pro: 1. Would enable DOE to pursue the total turnkey approach or other private industry alternatives for remaining new sites, while employing the COE for developing one site. This could reduce direct DOE management burden for developing up to 130 MMB.

2. This would remove DOE from day-to-day problems of managing construction effort at one new site, allowing greater concentration of effort on expansion at existing sites and development of other new sites.
 3. This option would satisfy COE management's request to permit COE to play an expanded role in SPR development.
- con:
1. Would involve establishing a reporting system to assure that DOE management is adequately informed of progress at COE site.
 2. Would increase DOE management or coordination burden to assure that development effort at COE site is compatible with development of other new sites and the storage system as a whole.

Option C: Decide now to delegate responsibility to the COE for development, operation and maintenance of all new SPR storage sites.

- pro:
1. Would definitize SPR plans for developing new sites and free up DOE resources to concentrate on construction and fill at existing and expansion sites.
 2. The Corps would provide a management layer between the DOE and the project which would minimize DOE's direct involvement in project implementation, and reduce DOE's management burden. May permit DOE management to pass some of the program responsibility to the COE.
- con:
1. COE's proposed management approach would not attempt to maximize use of industry capabilities.
 2. Would reduce DOE's control over schedules and costs for developing new sites while accountability would still rest with DOE.
 3. As another Federal agency, COE's management effort would be hampered by the same administrative, procurement, and bureaucratic impediments which have plagued DOE management of the Program.

4. As another Federal agency, it would be very difficult to offer incentives to encourage expeditious completion of the project, as demonstrated with the real estate acquisition effort of the COE.

Option D: Decide now to delegate full responsibility to the COE for SPR development beyond the initial 250 MMB, including expansion of existing sites and development of all new sites.

- pro: 1. Approval of this option would provide justification for relieving the Department of Energy of all SPR responsibility.
2. DOE would be able to concentrate on completing construction of facilities and filling existing capacity at the first five SPR sites.
- con: 1. Could result in additional costs to the Government to terminate the Parsons-Gilbane (P-G) expansion effort at existing sites. Must consider all P-G subcontracts which would be affected as well.
2. If DOE were to continue to have overall responsibility for the Program, proceeding with this option would severely impact DOE's capability to control and effectively manage Program schedules and costs.
3. Would not provide any guarantee that the SPR would be developed in a more timely and efficient manner than is possible under direct management.
4. Could result in some difficulties at existing sites because of dual management infrastructures. DOE staff/contractors would be on-site developing existing capacity; COE staff/contractors would be on-site developing new capacity.
5. Would require COE to pick up expansion sites mid-stream with many actions -- design, equipment procurement, drilling activities -- under contract.

Recommendation

That Option A be approved and the COE informed of our intent to pursue the turnkey approach to develop new SPR sites. Reconsideration of COE's offer will be undertaken if acceptable arrangements cannot be worked out on a turnkey basis with private firm(s).

This will permit DOE to pursue the course of action which offers the greatest potential for achieving DOE's schedule and cost objectives while still retaining control over costs, schedules and program direction.

Option A also would permit selection of the COE for a portion of the development effort should the turnkey approach be insufficient to meet SPR requirements.

POTENTIAL STORAGE LOCATIONS

<u>GROUP</u>	<u>LOCATION</u>
Seaway	Allen Dome, Texas
	Damon Mound, Texas
	Nash Dome, Texas
	West Columbia, Texas
Texoma	Black Bayou, Louisiana
	Big Hill, Texas
	Vinton, Louisiana
Capline	Chacahoula, Louisiana
	Iberia, Louisiana
	Napoleonville, Louisiana
	Cote Blanche, Louisiana
	Weeks Island (Expansion), Louisiana

FIGURE 1

ATTACHMENT 1

SEP 20 1978

Colonel Joseph S. Wood, Jr.
Deputy Director of Military Construction
Office of the Chief of Engineers
U. S. Department of the Army
Washington, D.C. 20314

Dear Colonel Wood:

We are most appreciative of the information you have made available on the Corps of Engineers' (COE) possible site development for the Strategic Petroleum Reserve (SPR) to my staff in briefings on August 1 and 24, and the schedule presented on August 30.

As you know, I met with Generals Bunnell and Consell on August 24, 1978, discussing this subject as well as our concurrent approach to private industry for turnkey efforts. We are developing a decision matrix to present to the Department of Energy (DOE) officials on the possible turnkey technical-cost-schedule alternatives available to the SPR to achieve the billion barrel objective by 1985. Within the matrix will be inputs from COE, private industry and Canada. Decisions made on a cost effective basis are integral to our planning, programming and budgetary processes within COE for subsequent approvals from the Office of Management and Budget and the Congress.

To enhance our mutual working relationships and objectives, I offer the following comments for your consideration pertaining to your detailed summary schedule of August 29 (copy enclosed for ready reference):

1. Current Technical/Design Data

I feel that it is essential that your staff meet, as previously suggested, with SPR engineers, to develop a work schedule based on current plans and design data as contrasted to your submittal based on the 1977 Capline Group talk show "Environmental Impact Statement."

2. 1/3 Selection

The period of 13 days appears short in light of the Federal procurement regulations.

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3. Design Duration

Seventy-five to 120 days appears most realistic based on our experiences with similar design and review work.

4. Electrical Design

The 30-day timeframe appears unrealistic since criteria and mechanical requirements must be determined before negotiations can commence with public utilities. In addition, the 60-day duration for ESA/public utilities' negotiations also appears underestimated.

5. Power Station

The procurement lead times for transformers and switchgears appear to exceed the seven months allowed.

6. Brine Pump Contract

The six months leasing of pumps is acceptable, however, the availability of pumps to be leased is a high risk assumption.

7. Brine Pipeline

The network does not indicate construction of brine pipelines.

8. Install Temporary Leach Pipes

The procurement and installation of pumps in five months is questionable.

9. Drilling Three Single Well Turrets

While the tri-lobed approach is favorable, our 300 wells requires 30 days for completion of the installation including time for core sampling. Subsequent wells will probably require a period of 20 days.

10. Site Preparation

The schedule does not include any activity for site preparation, such as access roads, site construction and material handling.

11. Leaching/Fill

The schedule indicates leaching of caverns utilizing 25 brine disposal wells. To accomplish cavern development an additional brine disposal wells may be required under the theoretically assumed disposal rate of 20,000 barrels per day per disposal well.

12. Fill Time

The schedule indicates fill before mechanical piping is completed.

13. Leach/Fill Time

The schedule indicates that leach, test and fill is to be accomplished in 2.3 years. Our studies indicate a theoretical time frame of 2.8 years, assuming no system down time.

14. Management

The data is not specific as to the working organizational network and the key personnel assigned. The method of obtaining necessary technical expertise, primarily leaching and brine disposal, for problems unique to this program is not addressed.

I am not aware of any DOE pre-decision on utilizing the DOE for site development. As EPR Director, I can subscribe to the DOE proven construction and institutional capabilities, but not with a blanket delegation of my managerial responsibilities and accountabilities. I am sure these differences noted above can be mutually resolved.

I do stand ready to work with you and to provide the additional information you may require to update the schedule.

Sincerely,

SIGNED

Leach
 Director
 Electric Research - Energy

enclosure.

PURCHASE OF OIL IN TURKEY PROCUREMENT

Issue

Whether the Strategic Petroleum Reserve (SPR) turnkey solicitations should request proposals from offerors to provide the crude oil to fill the storage developed under such contracts.

Background

This issue has arisen as a result of the decision to proceed with a total turnkey approach for acquisition, development and fill of new SPR storage complexes. It is assumed that under any turnkey contract, the contractor will design, construct, leach/fill (if required) and operate facilities developed under the contract until the storage is filled to its final capacity.

Currently, through an Interagency Agreement with the Department of Defense (DOD), the Defense Fuel Supply Center (DFSC) acquires the petroleum and the Military Sealift Command (MSC) acquires the transportation, as required, for delivery to the SPR Gulf Coast terminal complexes as scheduled by the SPRO.

Alternatives

Option A: Require all turnkey offerors to submit a priced proposal for the purchase and delivery of crude oil into storage, as well as development and operation of the complex.

- pro: 1. Places responsibility on a single entity to fully develop and fill one or more storage complex.
2. If offeror is currently involved in supplying and transporting crude oil, potential exists for economic benefits incidental to shipping flexibility and ability to effect timely crude exchanges.
3. Offeror may have access to existing commercial terminals/pipelines, not currently available to DOE, which could result in cost savings and more efficient scheduling.

ATTACHMENTS

4. Possibly, fewer U.S. Government employees would be required for oil acquisition and transportation than in Option C.
- con: 1. Likely to eliminate some firms qualified to design, construct, lease/fill and operate storage complexes because of lack of experience and in-house expertise in oil supply and transportation.
2. Reduces potential for direct Government-to-Government oil acquisition arrangements.
3. Unless oil is competitively procured by offeror, difficult to verify the actual cost of the oil and transportation, especially if interaffiliate transfer prices are involved.
4. Unlikely to be able to establish fixed firm prices, even with escalation, prior to six months in advance of commencing fill. Uncertainties concerning future domestic regulatory changes (e.g., possible entitlements imposed at wellhead, expiration of controls), and unknowns concerning OPEC pricing, may limit potential to the chance that a producer Government will secretly deal at a discount for its incremental production.
5. If DOE and/or more than one turnkey contractor are filling storage through a common distribution terminal, coordination of oil movements and establishment of priorities will be difficult and less efficient than if single manager is handling the operation.

|| Option E: Permit turnkey offerors to submit a priced option for the purchase and transportation of crude oil into storage to be developed by the offeror.

- pro: 1. If offer acceptable, places responsibility on a single entity to fully develop a filled storage complex.
2. If offeror is currently involved in supplying and transporting crude oil, potential exists for economic benefits incidental to shipping flexibility and ability to effect timely crude exchanges.

3. Offeror may have access to existing commercial terminals/pipelines, not currently available to DOE, which could result in cost savings and more efficient scheduling.
 4. If offer accepted, fewer U.S. Government employees could be required for oil acquisition and transportation than in Option C.
 5. Allows course of action to include oil purchase and transportation in turnkey contracts to be evaluated without DOE commitment to do so. Little would be lost by making the attempt to buy oil at a discount, even if the effort is unsuccessful.
 6. No otherwise qualified firms would be eliminated from turnkey competition because of inexperience or lack of interest in crude oil acquisition and transportation.
- con:
1. If offer accepted, reduces potential for direct Government-to-Government oil acquisition arrangements.
 2. Unless oil is competitively procured by offeror, difficult to verify the actual cost of the oil and transportation, especially if interaffiliate transfer prices are involved.
 3. Unlikely to be able to establish fixed prices, even with escalation, prior to six months in advance of commencing fill. Uncertainties concerning future domestic regulatory changes (e.g., possible entitlements imposed at well-head, expiration of controls), and unknowns concerning OPEC pricing, may limit potential to the chance that a producer Government will secretly deal at a discount for its incremental production.
 4. If DOE and/or more than one turnkey contractor are filling storage through a common distribution terminal, coordination of oil movements and establishment of priorities will be difficult and less efficient than if single manager is handling.

Option C: Do not permit turnkey offerors to submit a proposal for the purchase and transportation of crude oil.

- pro:
1. Maintain single source (POD) to procure oil and transportation for all SPR complexes under development through year end 1985.
 2. Maintain single source (O&M Contractor) to coordinate oil delivery requirements for SPR storage complexes through year end 1985, thus making shipping schedules more efficient.
 3. Maintain flexibility to negotiate Government-to-Government oil purchase arrangements.
 4. Assure that oil is competitively procured and that costs can be verified.
- con:
1. Cannot evaluate potential economic and operational benefits of turnkey contractor performing the oil acquisition and transportation function.
 2. No potential to reduce number of Government employees required for the oil acquisition and transportation function.

Discussion

At this time, there is insufficient knowledge of the scope of oil acquisition and transportation activities that turnkey contractors might be willing to perform, and the ability of the potential turnkey contractors to perform these functions.

Option A requires potential offerors to provide oil acquisition and transportation services in order to participate in the turnkey development of oil storage complexes and could eliminate some otherwise qualified firms, and possibly preclude the offer of one or more attractive storage development proposals.

Option C precludes the Government from taking advantage of potential benefits which may be gained through a total turnkey approach, including oil acquisition and transportation services, by turnkey contractors.

Option B, by allowing potential turnkey offerors to submit priced options for oil acquisition and transportation services, allows the Government the option to evaluate the cost versus benefit of turnkey contractors providing these services.

Recommendation

That Option B be approved and that solicitation for turnkey proposals permit turnkey offerors to include a priced option for oil acquisition and transportation services.

USE OF ENTITLEMENTS: ACQUISITION
OF "OLD" OIL

Oil purchased for the SPR currently is paid for in part by issuing entitlements to suppliers of imported crude so that, net of entitlements, the Government pays the national average composite price for the SPR's oil. DOE's regulations provide that firms become eligible for entitlements following Government acceptance of oil delivered for SPR storage, see 10 C.F.R. §211.67(d)(6), (7), with the result that, under the current regulations, a turnkey developer selling a filled site would earn entitlements. DOE's allocation authority under the EPAA, and hence the entitlements program, becomes discretionary May 31, 1979; it expires September 30, 1981, but could be extended by Congress. This presents two questions:

1. Should the turnkey solicitation allow for the possibility that entitlements will be earned on imported oil by a developer who delivers a filled site?
2. Will contractors be free to fill their sites with domestic oil that could be priced below the national average composite price for crude oil?

1. Inclusion of Entitlements Provisions

On October 22, 1976, the FEA General Counsel rendered an opinion that:

[T]here is substantial legal support for using the EPAA to allow the Government indirectly to obtain a proportionate share of price controlled domestic crude oil for fill in the SPR....

[T]he Government would engage in competitive procurement but would receive the benefits of cost equalization through modifications of the existing entitlements program.

It is unknown whether the entitlements program will be in force if and when filled sites are accepted by the Government. While it would be possible to provide in DOE's solicitation that the price for imported oil would be subject to entitlements if the program is in being when the filled sites are accepted, this would make it all the more difficult for offerors to price their oil, since they could not anticipate the magnitude of entitlements, or the delay in payment which use of a later-year entitlements system would entail. Furthermore, it would make it difficult to compare any offers for the provision of sites prior to September 30, 1981, until which date entitlements are authorized to be used, with offers for later delivery. Consequently, the preferred course seems to

be to solicit offers of imported oil without regard to entitlements, but to provide in the solicitation for contract renegotiation, at the time of the Government's oil acquisition, so that partial payment would be made through entitlements if the entitlements regulations are in effect at that time.

2. Offers of Domestic Oil

The FEA General Counsel's October 22, 1976, opinion concluded that it would not be legally supportable for the Government to utilize the entitlements program to acquire greater than its proportionate share of price controlled "old" oil. In a September 1, 1978, opinion, the DOE General Counsel advised that the entitlements program could be adjusted in such a way that in the future it effectively results in the U.S. acquiring oil for the SPR exclusively at the "old" oil price, but only if the savings achieved thereby were passed on to consumers when the SPR was drawn down. Thus far no plans have been made to accomplish this. Consequently, absent a decision to pass through the incremental cost savings, for the SPR to accept sites filled with "old" oil would be inconsistent with the General Counsel's advice as to the extent of DOE's authority, under the Emergency Petroleum Allocation Act, to utilize the allocation and price control powers for SPR oil acquisition.

However, as noted above, it is not known whether the allocation and price control program will be in existence when filled sites are accepted by the Government. Nor can it be predicted whether any domestic oil that might be offered for the SPR in fact will be priced below the national average price.

The turnkey solicitation is directed at obtaining the final increment of SPR oil. If it should develop that the Government was offered the benefit of "old" oil, and if at the time of Government acceptance the allocation and price control program existed in a form incompatible with such a preference, then it would seem that the regulations could be adjusted at that time so as to cause the Government to disgorge the improper benefit. For example, the Government might be made a buyer of entitlements to the extent necessary to reduce its domestic oil cost to the national average price.

Consequently, there appears to be no necessity to limit offers to imported oil, or to exclude "old" oil. Nonetheless, before a final decision is made consideration should be given to

whether the public would read into an unlimited solicitation some unintended implication with respect to the Executive Branch's intentions concerning oil decontrol, "old" oil pricing, or SPR purchases of domestic oil.

RELATIONSHIP OF NATIONAL ENVIRONMENTAL
POLICY ACT (NEPA) TO TURNKEY PROCUREMENT
OF SPR STORAGE SITES

DOE presently has final or draft environmental impact statement (EISs) covering some unselected 15 sites primarily in the Gulf Coast area. Initial responses to the CBD announcement for turnkey procurement indicate an interest in offering on a few of these sites. It should be possible, consistent with NEPA, to award contracts for immediate development of sites covered by EISs.

The question of whether an EIS is required for projects, such as a storage site, located in a foreign country, has been a subject of debate within the Executive Branch. Although the matter has not been finally resolved, it is likely to be concluded that where a foreign government is an involved party, no EIS is required. However, the "Joint Canada/U.S.A. Study of Strategic Petroleum Reserves Sites in Canada," June 1978, states that "application of the Canadian Environmental Assessment and Review Process...appears likely to result in approximately the same time elapsing (12-18 months) before final environmental approvals are obtained."

DOE legally cannot commit to development of a U.S. site for which there is no final EIS. Experience indicates that the EIS process on these sites is likely to take at least 12-18 months. As discussed under "Issue 2" of the attached ERDA analysis of environmental factors for projects involving competitive site procurement, there are four basic alternatives in the handling of the EIS requirement, aside from completing an EIS prior to commencement of the procurement:

1. Conduct the EIS process during proposal evaluation. This would assure NEPA compliance, but could be inconsistent with the confidentiality essential to the competitive process, and would significantly delay contract award.
2. Complete the EIS prior to contract award. This too would assure NEPA compliance, but suffers from disadvantages comparable to the first alternative.
3. Engage in NEPA review "after award of a contract for design...but...prior to a Go/No-Go decision to construct the project and prior to making irrevocable

commitments to...construction...or taking any environmentally significant actions...." This alternative would not be free of litigation risk, but the ERDA analysis seems to conclude that if properly structured, it would have a reasonable chance of being successfully defended. On the other hand, the absence of a Government commitment to proceed to construction until DOE completes an EIS process of uncertain duration and decides whether to go forward, may deter some offerors and impair the chances for negotiating a turnkey contract.

4. Prepare the EIS after the decision to construct, but before commencing construction. This involves so high a litigation risk as to be unacceptable as a practical matter.

Obviously, the only realistic alternative, other than for DOE to continue its current practice of conducting EISs prior to initiating procurements, is Alternative 3, completing the EIS process before a Go/No-Go decision is made. This could mean having the contractor proceed with design and other preliminary work, and establishing a mechanism for compensating him for this work if a No-Go decision is reached, but withholding any decision whether to construct. In the interim any land acquisition by the contractor might have to be at his own risk. The ERDA analysis states that under this approach, the litigation risk would be reduced if:

- (1) a publicly available selection statement documents that the environmental consequences of the competitive proposals were in fact evaluated in the selection process together with other technical and economic factors, (2) no irrevocable commitments to the construction and operation of the particular project, such as fabrication are made prior to completion of the NEPA review, and (3) no environmentally significant work, such as site preparation, is taken prior to completion of the NEPA review.

Given the delays and complications attendant to conducting the NEPA process in conjunction with a turnkey procurement, sites for which DOE has completed an EIS have an apparent competitive advantage. But as it is not known whether sufficient storage would be offered at such sites on an acceptable, turnkey basis,

it would be extremely risky to exclude other sites from consideration. Yet any contract awarded for such sites in the U.S. would have to be structured differently, and it presently is unknown which format would be used for Canadian storage.

ATTACHMENT H

RELATIONSHIP OF NATIONAL ENVIRONMENTAL
POLICY ACT (NEPA) TO TURNKEY PROCUREMENT
OF SPR STORAGE SITES

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3. Engage in NEPA review "after award of a contract for design...but...prior to a Go/No-Go decision to construct the project and prior to making irrevocable

commitments to...construction...or taking any environmentally significant actions...." This alternative would not be free of litigation risk, but the ERDA analysis seems to conclude that if properly structured, it would have a reasonable chance of being successfully defended. On the other hand, the absence of a Government commitment to proceed to construction until DOE completes an EIS process of uncertain duration and decides whether to go forward, may deter some offerors and impair the chances for negotiating a turnkey contract.

4. Prepare the EIS after the decision to construct, but before commencing construction. This involves so high a litigation risk as to be unacceptable as a practical matter.

Obviously, the only realistic alternative, other than for DOE to continue its current practice of conducting EISs prior to initiating procurements, is Alternative 3, completing the EIS process before a Go/No-Go decision is made. This could mean having the contractor proceed with design and other preliminary work, and establishing a mechanism for compensating him for this work if a No-Go decision is reached, but withholding any decision whether to construct. In the interim, any land acquisition by the contractor might have to be at his own risk. The ERDA analysis states that under this approach, the litigation risk would be reduced if:

- (1) a publicly available selection statement documents that the environmental consequences of the competitive proposals were in fact evaluated in the selection process together with other technical and economic factors, (2) no irrevocable commitments to the construction and operation of the particular project, such as fabrication, are made prior to completion of the NEPA review, and (3) no environmentally significant action, such as site preparation, is taken prior to completion of the NEPA review.

Given the delays and complications attendant to conducting the NEPA process in conjunction with a turnkey procurement, sites for which DOE has completed an EIS have an apparent competitive advantage. But as it is not known whether sufficient storage would be offered at such sites on an acceptable, turnkey basis,

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UNITED STATES
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
WASHINGTON, D.C. 20545

ACTION MEMORANDUM

TO: Acting Administrator
 FROM: Assistant Administrator for Environment and Safety *General Liverman 9/19/77*
 SUBJECT: CONSIDERATION OF ENVIRONMENTAL FACTORS FOR PROJECTS INVOLVING
 THE COMPETITIVE PROCUREMENT OF A SITE AND/OR PROCESS

ISSUE

The extent to which ERDA should consider and document environmental factors for projects involving the selection of a site and/or technological process through the competitive procurement process. For ease of analysis, two (2) issues are presented:

1. The extent to which environmental criteria should be included in solicitations for such projects.
2. The appropriate timing of NEPA review for such projects.

BACKGROUND

This Agency's implementing NEPA regulations (10 CFR Part 711) require the consideration of relevant environmental factors in agency planning and decisionmaking and the conduct of a NEPA review for all proposed agency actions with potential significant environmental effects. NEPA review (EIA or EIS, if required)¹ must be completed prior to taking any agency action on the proposal that would have a potential for significant environmental impact or would irrevocably commit major resources for the proposal thus foreclosing other reasonable options.

¹Since they do not meet the threshold requirements for a "major federal action significantly affecting the quality of the human environment," few proposed Agency actions require the preparation of a formal EIS reflecting the views of other agencies and the public. In these instances, however, it is sufficient to prepare a less detailed internal document known as an environmental impact assessment (EIA) (1) to document the reasons why the proposal is not a major federal action with environmental significance, and (2) to serve as environmental input into decisions on the proposed action. Programmatic EISs and EIAs serve to analyze the generic environmental impacts of technology options. Such programmatic NEPA review must be supplemented by site-specific project NEPA reviews prior to making irrevocable project commitments which foreclose reasonable alternatives.

As ERDA's decisionmaking process is currently structured in the nuclear technology programs generally and in (some nonnuclear technology programs) decisions between reasonable alternatives for proposed projects are made in the context of the budgetary process. For these projects, NEPA review is performed in support of requests for project authorizations and appropriations. However, for many nonnuclear technology programs, decisions between reasonable alternatives for proposed ERDA projects frequently are made in the context of competitive procurements. For those cases where potential environmental consequences of a proposed ERDA project may vary depending upon which competitive proposal is selected (i.e., selection of site and/or process to be put on a site), it is necessary to examine the appropriateness of considering environmental factors in the selection decision and of the timing requirements for conduct of the NEPA review for the proposed project. Since these issues are not specifically addressed in ERDA's procurement or NEPA regulations, there is a need to ensure consistency within ERDA on the inclusion of environmental criteria in competitive solicitations for, and the timing of the NEPA review for, ERDA projects involving the competitive procurement of a process or site.

ALTERNATIVES.

ISSUE 1

The extent to which relevant environmental criteria should be included in procurement solicitations that may have potential environmental consequences (i.e., solicitations for a site and/or process for a potential ERDA project).

Option A

Environmental criteria should be limited to objective factors as GO/NO-GO criteria and not be used as evaluative criteria.

- pro: Permits a more precise determination by source evaluation boards.
- con: NEPA requires the consideration of environmental as well as economic and other technical factors in agency planning and decisionmaking and, arguably the evaluation of the relative environmental merits of competing proposals in selection decisions.

Option B

Environmental criteria should be utilized as both GO/NO-GO criteria and as evaluative criteria, if there is sufficient environmental data to permit a meaningful environmental evaluation.

pros and cons: Converse of Option A.

ISSUE 2

The appropriate timing for NEPA review of an ERDA project involving the competitive procurement of a site and/or process.

Option A

The NEPA review should be undertaken during evaluation of proposals involving a process and/or site and the results of that review would be considered in the selection of a contractor.

- pro:
1. Complies with NEPA (if an EIS is required) by assuring that environmental input for any environmentally significant agency decision is subject to public scrutiny.
 2. Eliminates litigation risk under NEPA for failure to perform a timely NEPA review for an ERDA decision.
- con:
1. If an EIS were required, it would seriously harm, if not destroy, the competitive procurement process, the nature of which requires that proposals be held in the strictest confidence prior to contract award.
 2. Prolongs competitive procurement process.
 3. Supplementation of NEPA review generally would be required for any future ERDA decisions on the project.
 4. Less ability for agency control of the detail and quality of the environmental data needed for the NEPA review.

Option B

The NEPA review should be undertaken prior to award of a contract involving a commitment of resources to a particular site and/or process to the exclusion of other proposed processes and/or sites.

- pro:
1. Complies with NEPA since tentative selection of a proposer for contract negotiation does not irrevocably commit government resources to a particular course of action.
 2. Minimizes litigation risk under NEPA.
- con:
1. If an EIS were required, it would seriously harm, if not destroy, the competitive procurement process, the nature of which requires that proposals be held in the strictest confidence prior to contract award.
 2. Prolongs competitive procurement process.
 3. Supplementation of NEPA review normally would be required for any future ERDA decisions on the project.
 4. Less ability for agency control of the detail and quality of the environmental data needed for the NEPA review.

Option C

The NEPA review should occur after award of a contract for design and/or detailed site-specific data collection but must be completed prior to a GO/NO-GO decision to construct the project and prior to making irrevocable commitments to the construction and operation of the particular project or taking any environmentally significant actions with respect to the project.

- pro:
1. Complies with the spirit of NEPA since environmental factors will be considered at the same point in time and in the same detail as economic and technical factors in decisionmaking on proposed ERDA projects.
 2. Complies with the procedural requirements of NEPA given the small amount of government resources irrevocably committed to data collection and design (i.e., studies to develop a sufficiently definitive proposal upon which a recommendation will be made as to funding the construction and operation of a particular project).
 3. Protects the integrity of the competitive procurement process since proposals would in all cases be held in strict confidence prior to contractor award.

4. Should reduce the time from contractor selection to construction since NEPA review would be conducted concurrently with additional design and/or detailed site-specific data collection rather than prior to these project activities.
5. More detailed environmental data will be available so that a more meaningful environmental review can be conducted during design.

- con:
1. Presents a greater litigation risk than Option B since award of a contract, even though limited to studies, does commit some government resources and arguably forecloses a realistic consideration of alternatives, other than mitigating measures.
 2. Even though the selection statement will document the consideration of environmental factors during the selection process, this statement will not include the comments of other agencies and the public and is not intended to be a substitute for NEPA review.

Option D

NEPA review of an ERDA project would be conducted after the GO/NO-GO decision to construct and/or during site preparation but, in any event, completed prior to commencement of construction.

- pro:
1. The most detailed environmental data will be available with respect to the proposed ERDA construction project.
 2. NEPA review will have the least interference with timing of the project since all activities other than actual construction may proceed.
- con:
1. Presents significant litigation risk under NEPA since all realistic options would have been significantly foreclosed by resources committed prior to any documentation of environmental factors and formalized NEPA review.
 2. ERDA's public policy credibility since NEPA review at this point would appear to be merely a justification for a decision already made.

DISCUSSIONISSUE 1

NEPA requires that environmental factors be considered for all agency decisions with a potentially significant impact on the environment. In many cases, the process and site are designated by ERDA. There the NEPA review is performed in connection with the project authorization process. However, in those cases where ERDA is selecting from competing sites and/or processes through the procurement process, environmental factors should be considered in planning the contents of the competitive solicitation and in the selection process. Similar to economic and other technical criteria, the appropriate environmental criteria may vary from procurement to procurement depending upon such factors as specific procurement objective(s), knowledge and severity of generic environmental problems and the extent to which such problems may vary depending upon site specifics or the nature of the process.

Generally, competitive solicitations for a process and/or site for an ERDA project should include certain minimum environmental factors as objective GO/NO-GO criteria. An example of such objective criteria is the ability to meet all federal, state and local requirements for air emissions and water effluents. It is envisioned that the Environmental Development Plan (EDP) for the particular program as well as any relevant program EIAs or EISs will provide the basis for formulating meaningful objective criteria for such procurements. Use of these documents as a basis for criteria further helps assure public input into the planning process. More general environmental evaluation criteria, whether quantitative or qualitative, should normally be included in solicitations.

Appropriate inclusion of GO/NO-GO criteria, as well as evaluative criteria, in these procurement solicitations assures that environmental factors are considered and balanced along with economic and other technical factors in planning solicitations and selecting proposals for negotiation. Consideration of these factors should be documented in a publicly available selection statement.

ISSUE 2

ERDA's NEPA regulations require that a NEPA review (EIA or EIS) be prepared for proposed Agency actions having potential significant environmental effects and that such review be conducted prior to foreclosing reasonable alternative of environmental consequence by irrevocably committing major resources to a proposed action.

For those ERDA projects involving the competitive procurement of a site and/or process, NEPA review of the project prior to issuance of the competitive solicitation would not be practical since no process or site-specific data is available and would not be required since no resource commitments have been made nor options foreclosed by such issuance.

The first genuine decision point in the process is the selection of a proposal(s) for negotiation. At this stage, agency consideration of other respondent's sites and/or processes may tend to be foreclosed. Selection of a proposal for negotiation may release all other proposals. In such cases, if negotiations prove unsuccessful, it may necessitate a reconsideration of the other proposals in the competitive range, or perhaps even a resolicitation, and delays in the project may ensue. Moreover, selection is the earliest stage when information--environmental, economic, and other technical--can be evaluated in the decisionmaking process albeit in a limited manner. Accordingly, it is arguable that the absence of a NEPA review prior to selection may result in a court's setting aside the selection or enjoining the resulting award.

But, in OGC's view, such a litigation risk resulting from the absence of a NEPA review prior to selection for negotiation is extremely remote since no federal funds are irrevocably committed to a particular course of action and no reasonable alternatives are actually foreclosed. Moreover, if the NEPA review should entail an EIS, the requirement for public review could seriously harm, if not destroy, the competitive procurement process, the nature of which requires that proposals be held in the strictest confidence prior to contractor award.

The next decision point would appear to be the award of a contract committing government resources to a particular process and/or site for a proposed project, and it is arguable that NEPA review should be conducted prior to this point in time. Depending upon the extent of contractual commitment, the government's options will be narrowed to some degree both by the expenditure of funds toward the selected option and loss of time with respect to those alternatives. Consequently, postponing NEPA review until after award of a contract committing resources to a particular process and/or site for a project presents, in OGC's view, a further litigation risk.

For almost all projects covered by this paper, additional design and/or detailed site-specific data collection is normally required after contract award in order to obtain the data necessary to permit a meaningful detailed review of the environmental, economic and technical acceptability of proposed construction and operation of a project at a specific site. A GO/NO-GO decision point (i.e., to construct the project) should exist at the conclusion of this additional effort. It would appear that the most meaningful information for a NEPA review can be obtained during the conduct of this additional effort.

As previously discussed, there would appear to be an increased litigation risk if NEPA review was not performed until this stage since further resources have been committed. This risk would be reduced if (1) a publicly available selection statement documents that the environmental consequences of the competitive proposals were in fact evaluated in the selection process together with other technical and economic factors, (2) no irrevocable commitments to the construction and operation of the particular project, such as fabrication of substantial items unique to the project, are made prior to completion of the NEPA review,² and (3) no environmentally significant action, such as site preparation, is taken prior to completion of the NEPA review.

By carefully drafting the contract and assuring NEPA review prior to proceeding with the project beyond the design and data collection phase, the litigation risk of postponing NEPA review until after contract award can be minimized.³ Further, this timing of EIS⁴ preparation helps assure that, in keeping with the spirit of NEPA, environmental information is in fact considered together with economic and other technical data in determining whether to proceed with a proposed project.

²If the environmental impacts of the proposed process for the project are adequately covered in a programmatic NEPA review, the prohibition on fabrication of substantial items would be limited to items unique to the site.

³Conversely, postponing the NEPA review until after the GO/NO-GO decision to construct and/or during site preparation or construction prior to commencement of construction, as in Option D, would present a significant litigation risk since all realistic options would have been significantly foreclosed by resources committed prior to the NEPA review.

⁴Or EIA preparation, as appropriate.

RECOMMENDATIONSISSUE 1

It is recommended that appropriate environmental factors be included in procurement solicitations involving selection of a specific site and/or process for a proposed ERDA project both as GO/NO-GO criteria and as evaluative criteria to the extent there is sufficient environmental information to permit a meaningful environmental evaluation, and that consideration of these environmental factors be documented in sufficient detail in a publicly available selection statement to assure that the relevant environmental consequences of reasonable alternatives have been evaluated in the selection process. Thus, it is recommended that Option B be selected for this issue.

ISSUE 2

It is recommended that the NEPA review for projects involving the competitive procurement of a site and/or process be conducted as early as possible. In balancing the litigation risks with other policy considerations, it is recommended that if the consideration of relevant environmental factors in the selection process is documented in a publicly available selection statement in accordance with the recommendation on Issue 1, the latest point in time for conduct of the NEPA review be after award of a contract for design and/or detailed site-specific data collection but prior to a GO/NO-GO decision to construct the project and prior to making irrevocable commitments to the construction and operation of the particular project, such as fabrication of substantial items unique to the project, or taking any environmentally significant action, such as site preparation with respect to the project. Thus, it is recommended that Option C be selected for this issue.

The implementation procedures plans (per "Final Steps") should be presented to the C/S for review

Approve: *[Signature]*

Disapprove: _____

Date: 9/19/77

NEXT STEPS

1. Program assistant administrators working in conjunction with AES, procurement and involved field organizations will develop plans for implementation of the options chosen. The selection of environmental criteria shall be made by the responsible program office in consultation with the AES and procurement.

Mr. DINGELL. I am wondering why I have to ask for it, and when the staff asks for it, it is not available?

Mr. DELUCA. They didn't ask me. I don't know. I repeat, in utter candor, the staff may have that plus anything else I have.

Mr. DINGELL. I hate to hold hearings to get that kind of an assurance. We like to get the papers without holding hearings. It helps all of us and saves a vast amount of time in the future.

Who was it who made the decision to go turnkey?

Mr. DELUCA. The decision to go turnkey was based on my recommendation processed through the chain of command in the DOE, and the ultimate decider is not to go turnkey but to go the turnkey route and see what comes out. The decision is with Secretary Schlesinger.

Mr. DINGELL. What is the difference between making a decision to go turnkey and to go turnkey route and see what comes out?

Mr. DELUCA. Well, sir, suppose the proposals come back and from a technical point of view they may be unsatisfactory to us, from a performance, a criteria, a standard, a specification, a doability.

Mr. DINGELL. I can see that might well be. If you make a decision to go turnkey route and see what happens, haven't you committed yourself to go turnkey?

Mr. DELUCA. No, we haven't committed ourselves.

Mr. DINGELL. What safeguard do you have there to prevent that from being an irretrievable commitment?

Mr. DELUCA. The substantiveness of the proposal.

Mr. GORE. Will the chairman yield?

Mr. DINGELL. I am proceeding on your time, for which I apologize.

Mr. GORE. If you did not perform a cost analysis comparison between going the turnkey route, and doing it within DOE, then your proposals come back. On what basis do they look too high to you?

Mr. DELUCA. Three bases: First, we know what it is costing us to do. We know what we are proposing to do, the same thing, and, third, the competitive range of the proposals, themselves. There will be at least a dozen proposals oversubscribing the requirement by a multiple of the requirement. You will determine from the marketplace the competitiveness of the economics, which is the way our society works.

Mr. GORE. That is the way it is supposed to work, perhaps.

Mr. DELUCA. Sir, I assure you we will be good stewards in that control. But we have the baselines, and the competition, itself, will work the problem. That is what negotiations are for.

Mr. GORE. Well, coming back to the C5-A, all of those things worked through there as well. We were told that, in fact, it wasn't new technology either. We have already built the C-141, and all we need do is make a much larger version. We can keep track of it, and we know what they are going to do. It just looks so familiar that it is pretty disturbing.

Mr. DELUCA. May I give you a corollary?

Mr. GORE. Surely.

Mr. DELUCA. The alternative to going turnkey is to continue doing what we are doing. What we are doing, sir, is a phaseout of

someone doing the conceptual design. That architectural—A. & E.—engineering. And then competitively going out for the design-construct.

Mr. GORE. What is wrong with that?

Mr. DELUCA. All I am trying to say here, all we are seeking to wrap up in this package, is the same person concerned with the design-construct to also do the conceptual design.

Mr. DINGELL. Would the gentleman yield?

Mr. GORE. Surely.

Mr. DINGELL. You propose to make your decisions on this matter by the 27th of January; is that correct?

Mr. DELUCA. No, sir. We are coming in to you with these turnkeys that are out on the street now, competitively.

Mr. DINGELL. Competitively? Are you asking for competitive bids?

Mr. DELUCA. Yes, sure. Absolutely. That is why I say the force of the—now, wait a minute. Let's be sure we are talking about the same thing. There are three little turnkeys that were sole-source negotiations.

Mr. DINGELL. You have three that were sole source.

Mr. DELUCA. Ironton, Cote Blanche, and Napoleonville. They are the owners and operators who have agreed to come in with a proposal. We would like those obviously because they provide fill that there is no other way to get to under the expansion or under the turnkey.

Now, the turnkey proposals that come in in April finished for technical, June finished for economic, and August finished for your analysis—are all competitive. And furthermore, sir, as we get deeper into that I will tell you what is happening. First, we went into those other basis of discussions of acquisition. We would acquire the real estate. That migrated to a discussion of: How about leasing the site instead of acquiring it, and saving all those problems associated with it, and, sir, now we are on the plateau with these 13 companies we are doing business with, where they are beginning to say: How about considering the rental of storage space, a storage services contract, where we do our own financing, and we rent the caverns to you for x periods of time? We actually get out of any acquisition posture.

So what is happening in the industry is a great deal of innovative thinking to the creating of underground storage, and we will get proposals of renting caverns as distinguished from acquiring caverns.

Mr. DINGELL. I have some genuine reservations about what you have just described.

Mr. DELUCA. Sir, all we ask again is that we be allowed to present it to you. We will make no decisions.

Mr. DINGELL. Mr. DeLuca, I want you to go forward and do the job. I just want you to be helpful. I have some apprehensions about the way the matters are being conducted down there, and I think you can understand them, too.

Mr. DELUCA. I stand humbly—

Mr. DINGELL. Let me just give you a for-instance here that troubles me: You communicated to me on, I think it was the 4th of October, advising that you proposed to store under this, by year-

end, approximately 114 million barrels. Then on the 7th you communicated in a prepared statement, through Mr. Hystad, that the Department of Energy planned to have 90 to 100 million barrels in storage at year-end. Admittedly that is only 14 million barrels, or 24 million barrels, but it is different. Either you good folks aren't talking to each other, or your recordkeeping isn't too good, or your prognosis is bad, or you are telling somebody the wrong thing, or you are essentially misleading yourselves, or maybe misleading us—I don't know. It worries me.

Mr. DELUCA. Sir, in the middle of October and at the end of October, when the brine pads were not taking the brine and when the pipelines of Choctaw and Hackberry were blind-scheduled, and when some of the pumps and motors were off line or burning out, Don Mazur and I made this program stewardship report of November 3. It is at that time—

Mr. DINGELL. I am going to say that is a November 3 date as against October 4 and 7. And the figure grew, between the presentation to Senator Johnston and your communication to me.

Mr. McISAAC. It was October 4 at 14. The October 13 letter to you from me, Chairman Dingell, to 100, and then the stewardship report which Joe presented to Secretary Myers on November 3 and subsequently to Secretary Schlesinger, when he returned from China, that brought us down to our present fill projection at the end of the year of 70 million barrels.

Mr. DINGELL. I gather what happened, though, was the October 7 thing was cleared by OMB about a week before.

Mr. McISAAC. Yes, sir.

Mr. DINGELL. The letter we have is the 4th of October. You still have a divergence of figures.

Mr. McISAAC. Our figures projected at the end of the year were coming down every 2 weeks. This was the period of time we were supposed to ratch up, according to original schedules, the fill rates for the system as a whole. We found pipeline delays and found we were not getting a resolution of the brine disposal problem as hoped, and we were communicating this as rapidly as we could gain experience on what was actually occurring in the field.

Mr. GORE. General DeLuca, did you have experience in managing contracts in the Air Force?

Mr. DELUCA. Do you mean of this nature? No, sir.

Mr. GORE. You didn't have experience with the total package.

Mr. DELUCA. Do you mean total package procurement? No, sir.

Mr. GORE. Have you studied them since then?

Mr. DELUCA. I have been integral to the C5-A as Director of the Budget and Comptroller of the Air Force for quite some time prior to my retirement 3 years ago. I am obsolete. But I know the problems.

Mr. GORE. If you go ahead with the turnkey operation, do you intend to have firm, fixed prices?

Mr. RAUCH. The methodology we are following in this procurement which was announced to the industry ahead of time and discussed with them presents first unpriced proposals. Based on those proposals and an assessment of them, we will ask for price proposals. The exact technique of pricing is being considered right now. We are considering unit price, fixed price, various incentives,

but it hasn't been nailed down entirely. We have a very flexible approach on this one. That is why General DeLuca alluded to such things, potentially, as a lease arrangement.

Mr. GORE. They will last for 6 to 7 years; is that correct?

Mr. RAUCH. We have asked for a fill in the various sites they propose by 1985, sir.

Mr. GORE. Will you include change orders?

Mr. RAUCH. We have a change order provision with change control board.

Mr. GORE. Escalation clauses?

Mr. RAUCH. I can't anticipate at this time what type of escalation might be involved.

Mr. GORE. You would anticipate some type?

Mr. RAUCH. It is certainly conceivable.

Mr. GORE. Change orders, escalation clauses. This sounds familiar.

How much of the risk of the turnkey operation will be borne by the Government?

Mr. RAUCH. We are attempting in this procurement to place the maximum risk on the contractor in order to have a viable arrangement where they can come forward with their best proposition. We will have to look at their proposals. Certainly the Government today, in the approach we are following, the Government of the integrated systems manager, we are looking at having them be the integrater for a given site, where they would take all or as much as feasible of that responsibility.

Mr. GORE. General DeLuca, what do we do 7 years from now when DOE officials are back up here, hypothetically asking for an enormous increase in the amount of money scheduled to be authorized and the explanation given is that the contractors experienced unforeseen increases in their costs, the technology hadn't been used on this big a scale before, each site has different characteristics, and they have had overruns? What do we do at that point?

Mr. DeLuca. The status of this program, including the past and where it is going in the future, again if I may level, is of serious concern—almost an embarrassment, I might say, to the President, to the Secretary of Energy, to the Director of the Office of Management and Budget.

As a result, in these three chains of command and communication—White House, OMB, Department of Energy—we are working out to assure all the leaders as well as we, the workers, of these things of cost control and performance control and schedule control. We are working out with the Office of Management and Budget a systematic reporting system on these things that I mentioned before, cost and schedule primarily, when there is a report rendered periodically, very close periodically, covering exactly where every facet of the major contracts are. In other words, not only your position, but the position of the executive is to assure engineering and managerial control of this program.

Mr. GORE. I have got a GAO report here that talks about the transportation problems, and they say that DOE "has not developed a comprehensive plan for transporting the crude oil, nor has it prepared overall transportation cost estimates."

Now, a part of what is involved here is the cargo preference bill, which is another subject, but it does require 50 percent of Government cargo purchases to be shipped on U.S.-flag vessels. Are we going to be sitting here at some future point in time talking about massive price increases due to transportation costs, and when do you expect that a comprehensive transportation plan will be developed?

Mr. DELUCA. I would say the transportation plan, including the withdrawal plans, will be developed in the summer of 1979.

Mr. GORE. We will have a transportation plan in the summer of 1979.

Do you anticipate significant price increases in the program due to escalation in transportation costs?

Mr. DELUCA. Not beyond the normal that is hitting the economics of the Nation.

Mr. GORE. The normal increases in this program have been outrageous.

Mr. DELUCA. Sir, I am talking purely of the inflationary as distinguished from line-item costs.

Mr. GORE. One final question: The Japanese, according to news reports, have masses of storage of oil just offshore in old tankers. Am I way off base in asking whether that might not be a cheaper alternative than this program we are now embarked on?

Mr. DELUCA. That was considered, was it not?

Mr. LANGENKAMP. That has been considered, and my understanding is that other than in addition to the environmental problems, it was considerably more expensive, but the Japanese have a number of tankers fully staffed with crews and they are idling. In effect, it is a plan of demurrage, perpetual demurrage, and I think the cost figures which we will be glad to give you would show you the difficulties in that sort of program.

Mr. GORE. I would like to request that.

Mr. McISAAC. If I might just add, Congressman Gore, you alluded to the fact that the tankers the Japanese were using were old, and they are not. These are very large crude carriers. I believe they have 20 2,500,000-barrel capacity crude carriers in slow steaming off the Isle of Iwo Jima. This was reported by the press. And I believe our cost estimates for those were significantly higher than any alternative form of storage that we could see.

In addition, we had a number of environmental problems associated with that if we were to employ it in this country which, in our judgment at the time we examined this, which was in the middle of the summer, precluded this.

Mr. GORE. Well, I would like to see those figures. The chairman may be well satisfied with that.

Mr. DINGELL. Without objection, the figures referred to will be inserted in the record.

[The following information was received for the record:]

TANKER STORAGE COSTS

Purchasing tankers

The Institute for Defense Analysis (IDA) performed a study for the Federal Energy Administration entitled, "Use of Tankers for Stockpiling Petroleum" in November 1976. The study estimated the lifecycle costs of purchasing and operating a storage facility comprised of 100,000-deadweight-ton tankers for a 15-year period,

and found the discounted present value of tanker storage to be \$6.42/barrel. This cost includes a salvage value of \$4.22/barrel for tankers. These cost estimates do not include costs of modifications and equipment required to meet Environmental protection standards. Tanker purchase costs are summarized below:

	<i>Cost per barrel</i>
I. Initial investment:	
Tanker purchase	\$4.22
Refurbishing costs.....	0.14
Movement to United States28
Vapor recovery system56
Yokohama fenders.....	.11
Subtotal.....	5.31
II. Annual operating costs:	
Crew, maintenance materials.....	.24
Evaporation loss.....	.04
Subtotal (\$4.20 for 15 yr)28
III. Program termination costs: Tanker sale.....	4.22
Total	5.29

Chartering tankers

In early 1978, studies undertaken by the Department of Energy estimated costs of chartering tankers for use as temporary storage facilities at \$0.15/barrel/month or \$1.80/barrel/year. Assuming a 15-year storage period and a discount rate of 10 percent, the present value would be \$13.68 per barrel.

Mr. GORE. One final question. I apologize to my colleagues for encroaching. This is just a general question.

Due to the discovery of these massive new reserves within this hemisphere, has any thought been given to totally reworking the size of this program? Do the Mexican discoveries impact the overall purpose of this program?

Mr. McISAAC. Not to this date, Congressman Gore. We are still looking at a dependency on out into the 1980's of this country for foreign imports of in the range of 10 million barrels a day and upward. We are still looking at heavy dependency on Middle Eastern crude. We still have the same degree of concern that was prevalent when the program was formulated about the assurance of supply. Mexican discoveries regardless of what size they are, and we all know the debates about the ultimate size, are still undeveloped. Given even the wildest projections of Mexican crude, it is going to take a significant amount of time and a huge investment in Mexico to develop.

So our dependencies don't look, at least at this stage, to be significantly relieved by what is going on in Mexico.

Mr. GORE. Thank you.

Mr. DINGELL. The Chair thanks the gentleman.

The Chair recognizes the gentleman from Louisiana.

Mr. MOORE. Thank you, Mr. Chairman. I think the chairman knows I am no defender of the Department of Energy, but for the life of me, I really can't understand what we are doing here this morning. It appears to me that Mr. DeLuca has very honestly and very candidly told us his department doesn't have the expertise to design, build and run these things. He would like to be able to go out on a turnkey project and buy that expertise.

Judging from the explosion that took place at Hackberry, where this played a part—Hackberry is my hometown years ago and we can't take too many explosions like that; Hackberry isn't that big—

I am not going to argue with him. If he tells me that his past experience and his lack of expertise is there, I am not going to argue with him. Quite the contrary, I am going to commend him for being honest and look to somebody who has that expertise. Mr. DeLuca—

Mr. DINGELL. Will the gentleman yield for a brief question?

Mr. MOORE. I am yielding for a question, Mr. Chairman.

Mr. DINGELL. Maybe Mr. DeLuca can tell us who it was that was running that operation down there when you had the explosion; was it DOE or was it a contractor?

Mr. DELUCA. When we had the explosion, it was run by contractors, but there is a question of the discipline within the contractors' relationships with each other.

Mr. DINGELL. So essentially it was contractors. And it would be contractors running turnkey, would it not?

Mr. DELUCA. Well, sure, it would be contractors running the turnkey.

Mr. DINGELL. I thank the gentleman for yielding.

Mr. MOORE. Mr. Chairman, if there is going to be an explosion, wouldn't it be better for the private contractor to bear that expense and the blame and not the Government?

Second, Mr. Chairman, it appears to me that there is no doubt but what he thinks DOE did not have the expertise to act within these caverns and may well have overlooked a safety item of not operating under pressure, that anybody in industry that fools with caverns knows. So the point is DOE is admitting that. I commend them for it. It is very unusual.

Mr. DeLuca, I hope you have a long history of Government service, because I don't see too many people in Government today that have that kind of candor, at least since I have been here. I appreciate that.

But since we now are going to argue with you, it appears the subcommittee is arguing with the decision of you going to a turnkey project, which as I say, and the logic escapes me why we do that, I would simply ask you to go in a little bit deeper for those members of the subcommittee and for the record, a little bit more about this cavern activity that has been going on.

I live in Louisiana where these things exist. We have been using them for years.

Anybody on your staff could tell us just how long industry has been using these caverns in Louisiana for storage, how many years back it goes into history?

Mr. DELUCA. Decades, I am sure.

Mr. MOORE. It goes back I think at least that. I know of domes in Louisiana we have stored natural gas in it and what-have-you for 30 or 40 years, perhaps longer.

Second, Mr. DeLuca, I would like for you to ask, does anybody on your staff have an idea of range of products that are stored in these domes? Can you tell us, it is not something that is just oil or something you just started fooling around with, but in fact people like Dow, Allied, Exxon have been storing, what range of products or materials in these cavities?

Mr. DELUCA. Ethylene is a common product.

Mr. MOORE. Ethylene is a common product.

What about natural gas, do they store in these domes? I think many others—

Mr. DELUCA. Liquefied petroleum gas, all across the realm. It is the common way of storing.

Mr. MOORE. Exactly.

Now another factor, you said a moment ago that you named four companies that you knew of that were fooling with these domes.

Can you give us a number of how many companies either own or operate salt dome storage facilities across the gulf coast where these domes seem to be most prolific?

Mr. McISAAC. We would have to submit that for the record, Congressman Moore.

Mr. MOORE. I wish you would, because there seems to be a question about the propriety of this.

[The following information was received for the record:]

LOCATION AND DESCRIPTION OF SALT DEPOSITS

Figure 1 shows the extent of major subsurface salt deposits throughout the United States. The salt deposits are in two categories: (1) rock salt in subsurface bedded deposits and (2) salt dome basins. Rock salt in subsurface bedded deposits means there are one or more layers of salt beneath the earth's surface. The layers may vary in thickness from a few feet to over 1,000 feet and occur from a few feet to over 20,000 feet below the surface. A "salt dome" is a continuous column of salt that originated from a salt bed several thousand feet below the surface and slowly moved upward through overlying sediments to as close as a few feet below the earth's surface. A piercement salt dome is generally circular or semi-circular with a diameter ranging from less than a mile up to 12 miles. Some piercement domes are covered with a "cap rock" which is a source of elemental sulphur.

As the salt domes were being formed, another important phenomenon took place. The essentially horizontal layers of sediments or sedimentary rocks that were pierced by the dome were tilted at an angle, forming traps for oil and gas. Most of the huge oil fields in the Gulf Coast region were similarly formed.

There is a possibility that salt dome structures exist in the continental shelf areas of the Atlantic Coast, but no published data is available to support or confirm their existence. There are dome-shaped structures in those waters, but they could be shale or igneous intrusions; no attempt is made to depict these structures in this report. There are piercement salt domes in the Paradox Basin of southeastern Utah and in southwestern Colorado, and salt masses resembling salt domes in the Supai Basin in east central Arizona. However, the area discussed in this report is the Gulf Coast Basin of Texas, Louisiana, Mississippi, and Alabama. The extent and location of the above areas are also shown in Figure 1. The various theories and information regarding these structures are available in many publications. A reference often referred to is Hanna [2].

The first major rock salt deposit was discovered in 1862 during the Civil War as a result of deepening a well to increase the supply of salt. The hand-dug well was very shallow; however, this well was actually the discovery of the Avery Island Dome in Louisiana. Many years would pass before the science of salt domes was understood and this deposit was realized as a domal structure.

The Avery Island salt dome was one of a group of five mounds or "islands" extending from near New Iberia southeastward to the marshy coast of Louisiana. The discovery of rock salt first on the Avery Island dome led to exploration and drilling of the others. These five islands--later proven to be salt domes--have become a location for rock salt and brine production.

SOURCE: "A Survey of Salt Deposits and Salt Caverns, Their Relevance to the Strategic Petroleum Reserve," a publication of the Federal Energy Administration, FEA/S-76/310.

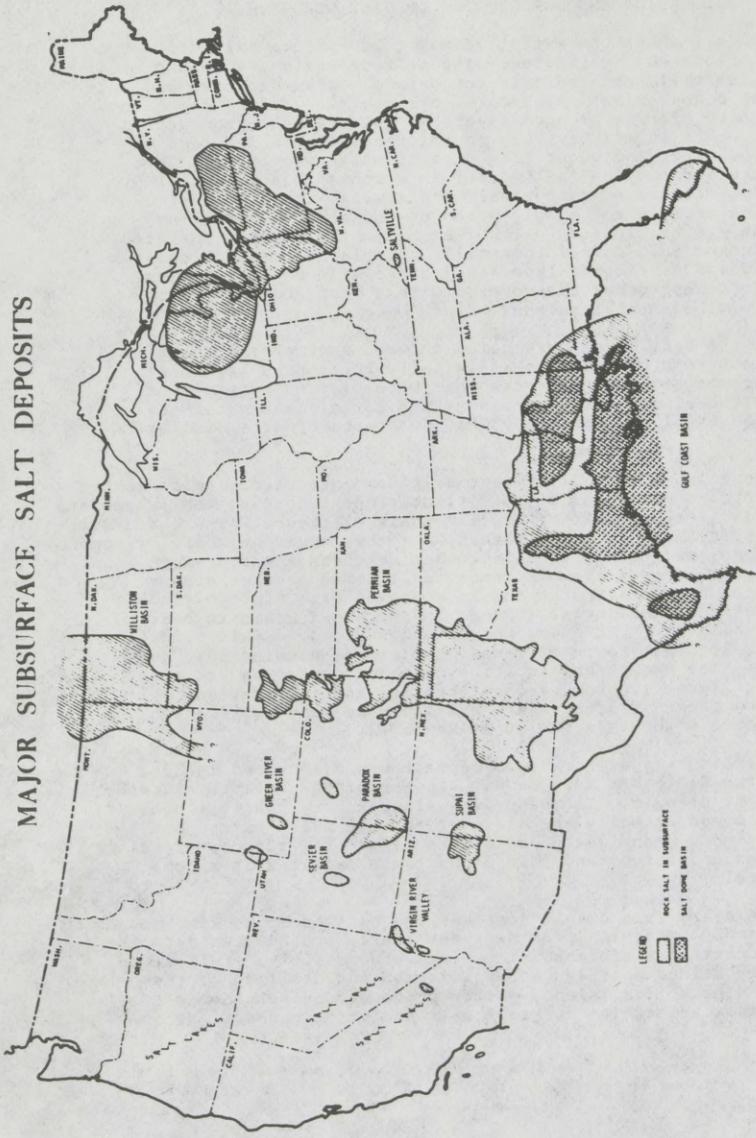


Figure 1. Major U.S. Subsurface Oil Deposits

The last one, Cote Blanche Island dome, was finally developed for salt production when mining operations began in 1964. The five domes of the group are Avery, Belle Isle, Jefferson, Weeks Island and Cote Blanche--the last to be developed in 1964. Following the initial discovery of the Avery Island dome, several years passed before enough information became available to define salt domes as such. Rock salt was next reported in 1888 at the Grand Saline dome in east Texas; brine was produced at about one dozen other locations in east Texas and north Louisiana during the Civil War. All the above locations were on what later would be determined to be salt domes. By 1900 about a dozen domes had been identified and many more were thought to be domes from knowledge of surface expressions that were similar to those already found. The discovery rate increased as more and more information regarding salt dome structures was assembled, along with an increase in drilling activity, and an increase in geological and seismic technology. By 1920, about 60 domes were known; by 1950, about 250, and in this report, 524 are listed. Many of the domes discovered in the last 10 years are in the Gulf of Mexico, several miles off the shores of Texas and Louisiana, some in water ranging 1,000 to 2,000 feet deep.

Before the discovery of commercial crude oil production, the mineral obtained from salt domes was salt. In 1894 Herman Frasch attempted to produce sulfur from the cap rock of the Sulphur Mines dome. Although his early attempts were unsuccessful, the Frasch process was finally proven commercially successful and, with some modification, is still used to produce sulfur from several dome cap rocks in Louisiana and Texas, as well as other deposits located in West Texas. The search for and production of hydrocarbons in the sands above domes, on domal flanks and nearby traps, however, was the mechanism which led to discovery of the great majority of all salt domes now known. Of the 524 domes studied in this report, there is an almost equal distribution between those onshore and offshore. There are 256 salt domes listed offshore--48 in Texas waters and 208 off the coast of Louisiana--and 268 onshore. Figures 2 and 3 show the location of the offshore domes. They were adapted from geological maps prepared by the U.S. Department of Interior, Bureau of Land Management. Correspondingly, Tables 1 and 2 list the Texas and Louisiana offshore domes. Some of the domes are as far as 145 miles from the nearest shoreline and lie in water up to about 2,500 feet deep.

During the past 10 to 15 years, the major increase in drilling and exploration in the petroleum industry's search for oil and gas in the United States has been in the Gulf of Mexico [6] near salt dome structures. About 150 of the 256 offshore domes were commercially hydrocarbon productive (or productive, shut-in) of oil, and/or natural gas and condensate as of June, 1975.

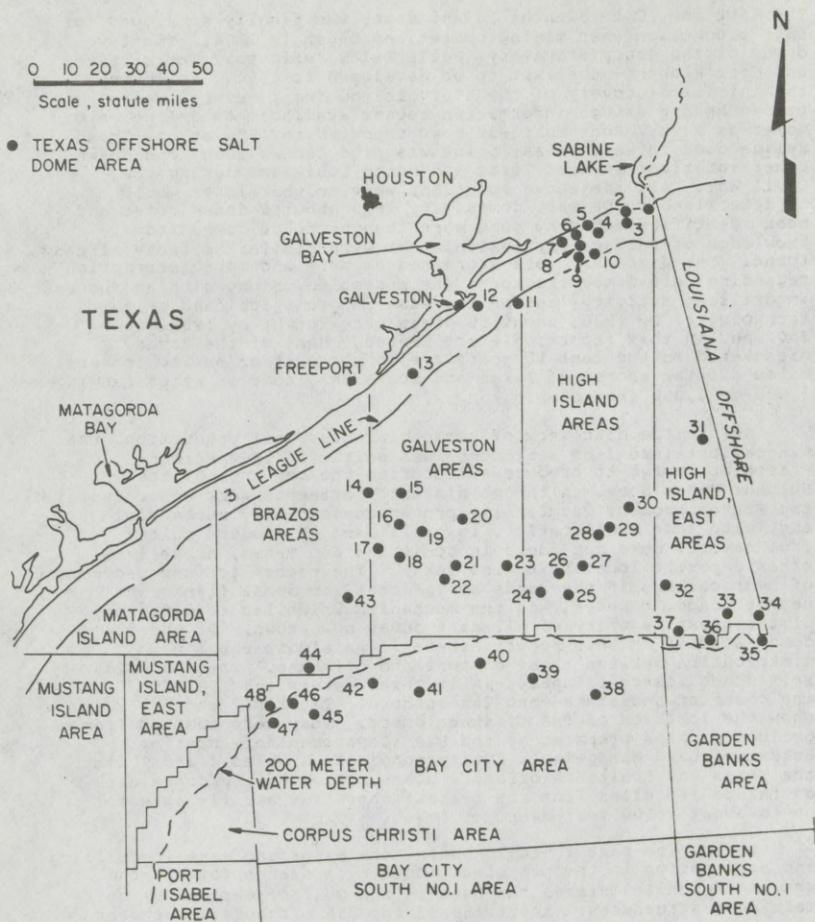


Figure 2. Location of Texas Offshore Salt Domes

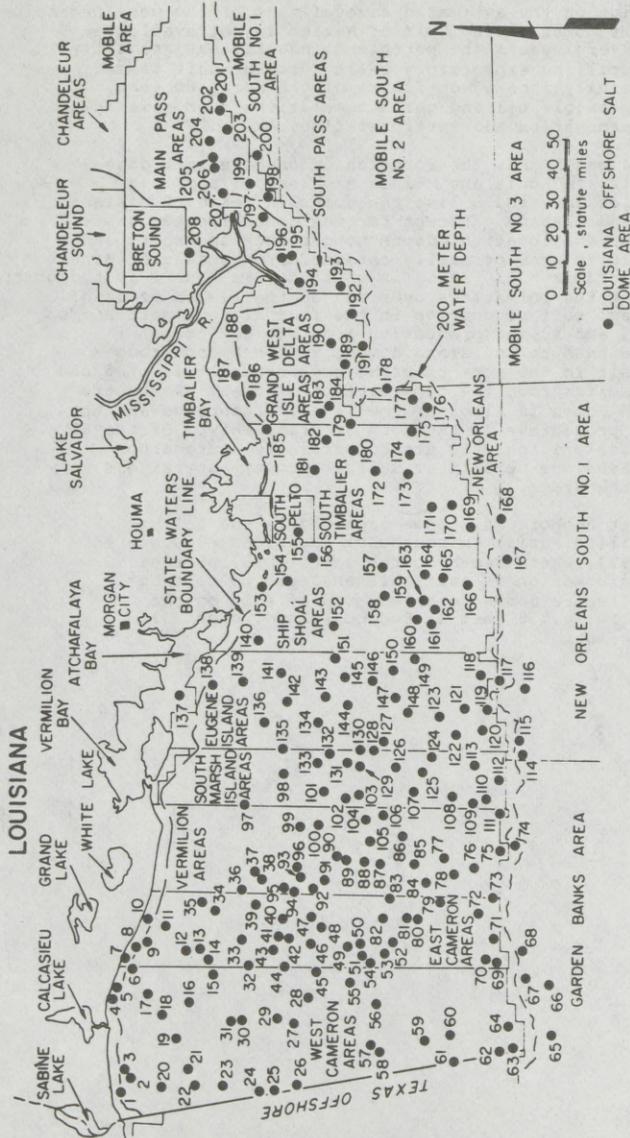


Figure 3. Location of Louisiana Offshore Salt Domes

Information on the estimated size of many of the more recently discovered salt domes in the Gulf of Mexico is not available; in the past several years the petroleum industry has gradually discontinued drilling exploratory wells into the salt mass. Wells are carefully located on flanks of the domes to test formation of possible oil and gas accumulations from seismic and geophysical information and interpretation.

Figures 4 and 5 show the location of onshore salt domes: 79 in Texas, 125 in Louisiana, 62 in Mississippi and 2 in Alabama. Tables 3,4, and 5 list the domes in Texas, Louisiana, Mississippi, and Alabama. Except for new domes listed, basic data as to name and location, depth to cap rock and salt, and mineral activities were primarily obtained from Bureau of Mines Information Circular 8313, 1966, as updated [3]. There is hydrocarbon production from the formations over and on the flanks of 55 of the Texas domes, salt production in the form of rock salt and/or brine from 10, and sulfur production from the cap rocks of 5 domes. Of the onshore Louisiana domes, 90 are hydrocarbon productive, salt in the form of brine and rock salt is produced from 13, and sulfur from the cap rocks of 4 domes. There are only two known domes in Alabama; one is oil productive and the other is salt productive in the form of brine only. Of the 62 domes in Mississippi, only 10 are commercially hydrocarbon productive; there are no salt or sulfur recovery operations on any domes in the State.

The deepest onshore salt dome reported is the Leleux dome in Vermillion Parish in southeast Louisiana, discovered in February 1973, where depth to the salt is 20,105 feet. Although no information is available on depth to salt in most of the offshore domes reported, top of salt on the deepest known is 16,850 feet at Eugene Island, block 32, offshore Louisiana.

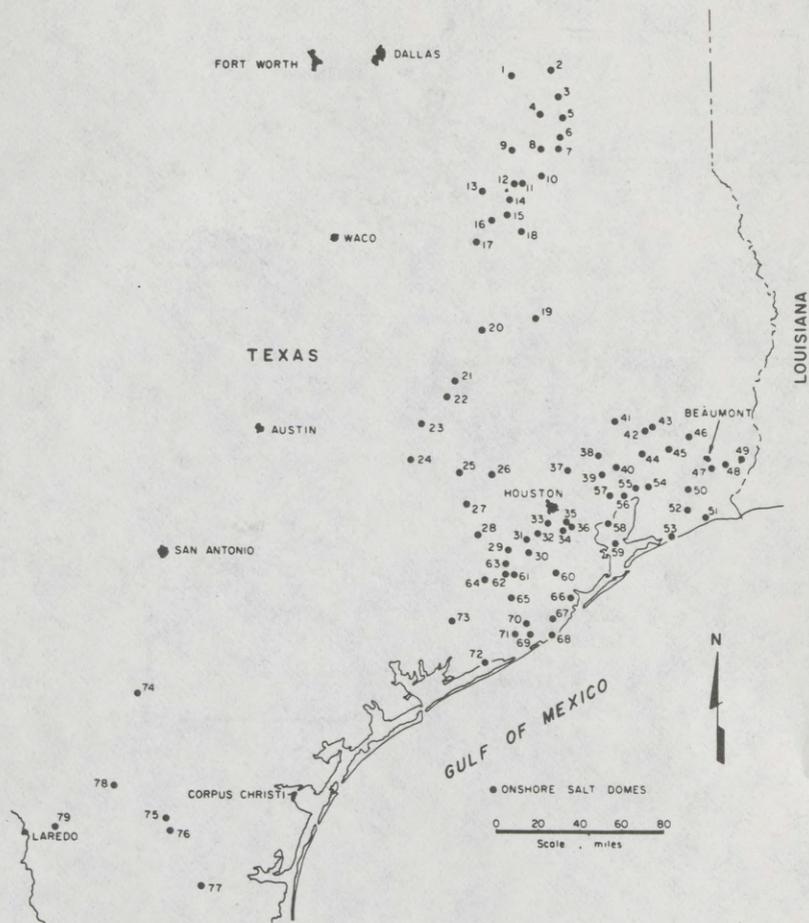


Figure 4. Location of Texas Onshore Salt Domes

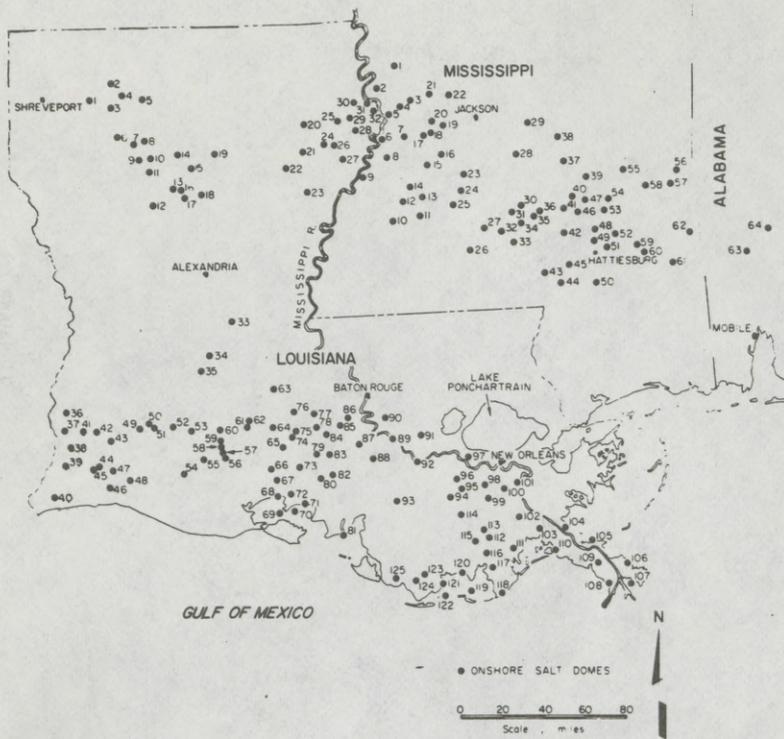


Figure 5. Location of Louisiana, Mississippi, and Alabama Salt Domes

Mr. MOORE. What I am trying to point our is something you said earlier, that the technology of this is not something new, it is something that is going on every day, industrially, commercially, in Louisiana, Texas, and has been for, as you say, many, many decades.

The next point is that we are talking about cost overruns. Certainly nobody in the Government, nobody wants to see that happen. But, General, you had a history of working with these sorts of things.

Isn't it true that some cost overruns are the fault of the Government and not necessarily the contractor, by changing specifications, changing demand designs, what-have-you?

Mr. DeLUCA. Yes, sir.

Mr. MOORE. And I would also think that you made the comment initially, and I am sorry I didn't ask that question of Mr. Fitzgerald, I think you are entirely correct, there are tremendous differences, I don't think it is even really very logical to compare likenesses of designing the world's biggest aircraft and taking a salt dome and maybe extending it to 30 to 40 percent in size over what one has been existing in this country before when the technology is the same; would you agree?

Mr. DeLUCA. Positively and absolutely.

Mr. MOORE. Well, I encourage you. The thing that concerned me about this whole project is the fact that you are under pressure from the Congress and from the President to move quickly to make this project work, and we see now that maybe that is not the wise thing to do. Maybe the wise thing to do is turn the project over and hire somebody who knows how to do it and then buy the project from him or rent it from him, as the case may be, which makes a lot of sense to me, and I encourage you to continue.

One question I do have aside from this is in looking into the explosion thing in Hackberry and trying to follow back up the line who all was involved, we come across this engineering firm of Parsons-Gilbane. This was before your time, General DeLuca, maybe you or somebody else can answer the question.

Why were they hired?

Mr. MAZUR. Parsons-Gilbane is the construction manager in total for the construction activities, including West Hackberry and all the other sites.

Mr. MOORE. Right.

Mr. MAZUR. In relationship to the activity at West Hackberry that took place at the explosion time, they were also the drilling manager to which the drilling contractor, in this case, Louis Records, who was performing the activity was responsible.

Mr. MOORE. Let me ask you what was the experience of Parsons-Gilbane in this kind of activity, what was their experience?

Mr. MAZUR. In construction management experience?

Mr. MOORE. All right. Take that one first, of a salt dome experience. Construction management experience of a salt dome experience.

Mr. MAZUR. I personally don't have any knowledge of their past experience in salt domes. They have worked in Louisiana, in terms of terminals, oil terminals, refiners, so forth. They are the Ralph M. Parsons Co. with the Gilbane Associates in Providence, R.I.

Mr. MOORE. They are based in Rhode Island?

Mr. MAZUR. No. Gilbane Building Associates—a member of the joint venture—is in Providence, R.I. Ralph M. Parsons Co. is out of Pasadena, Calif. Together they formed the joint venture, Parsons-Gilbane Co.

Mr. MOORE. Now what was their activity, or what was their experience in terms of overseeing drilling operations into salt domes or whatever?

Mr. MAZUR. The management experience had to be acquired in order to take on the task, and they were doing that.

Mr. MOORE. Then from what I understand, you have no knowledge of either members of this joint venture ever working with salt domes before or ever actually having worked as drilling managers before.

Mr. MAZUR. In that context, that is right.

Mr. MOORE. OK. I think that was part of the problem but that is water under the bridge at this point.

How did they get hired, do you know that? Was it a bid situation? How were they retained by DOE to do this work?

Mr. McISAAC. I think Carlyle Hystad is in a position to answer that question.

Mr. HYSTAD. This was the result of a competitive selection process that was undertaken by the FEA. They were selected as the best of the offers we received.

Mr. MOORE. Do you remember whether or not there were any companies that had had experience in this, that tried to put in a bid or asked to be considered?

Mr. HYSTAD. I don't remember the full list of those who submitted proposals. We could provide that for the record. I do not have that at the top of my head.

Does anyone else recall?

No, we can submit that for the record.

Mr. MOORE. I would appreciate that.

[The following information was received for the record:]

COMPANIES SUBMITTING COST PROPOSALS

Over 200 companies responded to the F.E.A.'s Architect/Engineering Solicitation for subject contract award by submitting Form 254/255 in accordance with Federal Procurement Regulations.

A total of 12 contractors were selected for further discussion. Two contractors were later ruled out: Gulf Interstate Engineering Company, Houston, Texas, due to conflict of interest and Morrison Knudsen Company, Boise, Idaho, who voluntarily withdrew.

There were ten companies who participated in technical discussions:

FLUOR, Washington, D.C.; R. M. Parsons/Gilbane, Washington, D.C.; Sante Fe Engineering, Orange, Calif.; Pace Company, Houston, Texas; King-Wilkinson, Inc., Houston, Texas; Kaiser Engineers, Oakland, Calif.; Bechtel, San Francisco, Calif.; Catalytic, Inc., Philadelphia, Pa.; Dravo, Pittsburgh, Pa.; and Ford, Bacon and Davis, New York, N.Y.

Cost proposals were solicited from all ten companies. However, only six companies submitted a cost proposal for evaluation:

R. M. Parsons/Gilbane; Santa Fe Engineering; Pace Company; King-Wilkinson, Inc.; Kaiser Engineers; and Dravo.

Ford, Bacon and Davis submitted a cost proposal which was rejected as it was received after the final submission date.

R. M. Parsons/Gilbane was selected for negotiations and ultimately awarded the contract.

Mr. MOORE. I have no further questions, Mr. Chairman. Thank you.

Mr. DINGELL. The Chair thanks the gentleman.

Mr. BARRETT?

Mr. BARRETT. At this point, has there been a problem of overobligation or deobligation of funds?

Mr. DELUCA. No problem of overobligations, Mr. Barrett. There was when we petitioned for our reprogramming, and that was deferred until the convening of Congress in January.

Mr. Mazur and I, in discussion, worked the problem in order to get the best utilization of funds to see what we could decommit and deobligate. So there was some of that. That was to make funds available to stretch through February. I am not familiar with any overobligation of funds.

Mr. BARRETT. There has been an effort to deobligate certain funds.

Mr. DELUCA. Sure, to stretch ourselves to survive through the consideration of the reprogramming.

Mr. DINGELL. Mr. DeLuca, can you explain to me why you deobligate if you hadn't overobligated in the first place?

Mr. DELUCA. Well, sir, when we asked for the reprogramming, we asked for \$450 million to carry us through 5 months, through February. If we had stayed on a programmatic schedule, we would have required \$611 million that we would obligate through that period of time. Since the \$450 million was deferred, all that we had available to us was the 1979 appropriation of \$103 million and a 1978 carryover of \$125 million, which made available \$228 million to survive through February and, therefore, as a good, old comptroller, I say, OK, we try to make that last as long as we can. So what is it that we may have on PR, purchase request, or what is it that we have obligated now that doesn't have to be done now so you can give me as much money back as possible so we can survive these 5 or 6 months? That then caused the \$228 million that we had to be prioritized to the existing sites and to the Bryan Mound expansion. So there wasn't any of that overobligation per se.

Mr. DINGELL. Thank you.

Mr. BARRETT. You bought a number of caverns without testing them first for pressure? You now have several caverns that are unusable?

Mr. McISAAC. Carlyle Hystad will answer that question.

Mr. HYSTAD. In the selection of the initial sites, these were selected prior to completing all the required pressure tests and surveys. We had some information from industry regarding the suitability of these caverns, and the information we had at that time led us to believe that they were suitable for storage. In fact when the pressure tests were conducted, we found that at Bayou Choctaw there were a number of caverns there at the shallow level in the dome that did not hold pressure. Repeated efforts were made to try to stop the leaks and without success. So we have not been able to use those shallow caverns.

Mr. BARRETT. But we own them.

Mr. HYSTAD. We have acquired the property by condemnation. I believe we don't have a final settlement.

Mr. McISAAC. The question is, Do we have a final settlement on the compensation at Bayou Choctaw? I would like to get our legal counsel to follow that. I understand there is continuing negotiations. There might be some litigation on that.

Mr. FYGI. It is my understanding we do not as yet have a final settlement on that question.

Mr. BARRETT. Final settlement on whether we own it or how much we are going to pay?

Mr. FYGI. On the issue of just compensation.

Mr. DINGELL. Did the contract to purchase or the offer in any way include a requirement that the cavern in fact be tight and not be subject to leakage?

Mr. HYSTAD. No, not in this case. But the position was that this was being acquired for storage, and presumably in the final decision by the court as to the just compensation, that will be taken into consideration, that these caverns indeed were not suitable for storage.

Mr. DINGELL. There is a difference between having a requirement, saying that the cavern is suitable for storage, and saying that it is being acquired for storage. If you tell the other fellow you are acquiring it for storage, the court is going to give you a great deal of sympathy, but they are going to give him the money. If you are acquiring it subject to a condition that it be suitable for storage and the terms are roughly set out, the court is liable to give you a great deal more consideration as regards fiscal matters and the other party a great deal more sympathy.

Now which was the case?

Mr. FYGI. Well, as I understand the thrust of your remarks, you appear to be combining two sets of principles, one, the sort of contract principles of what the terms between two parties negotiating would be, and the other, the more distant arm's length relationship of a condemnation proceeding; and in the condemnation proceeding whether the deficiencies for oil storage of these salt domes will be considered in evaluating just compensation will be dependent upon whether that use was the highest and best use for that property in that area.

Mr. DINGELL. So you acquired those caverns that are not suitable for storage through the condemnation process?

Mr. FYGI. I am sorry, Mr. Chairman.

Mr. DINGELL. I am saying you are indicating to me that the caverns which were acquired and which are not suitable for storage were acquired through the condemnation process?

Mr. FYGI. That is right.

Mr. DINGELL. As opposed to being acquired through the negotiation process?

Mr. FYGI. That is correct.

Mr. DINGELL. Thank you.

Mr. BARRETT. I think your testimony, Mr. DeLuca, is that you have not developed cost estimates for the final 250 million barrels.

Am I to understand then that the \$25 billion cost estimate is for the first 750 million barrels in storage?

Mr. DeLUCA. No. What I am saying, in answer to Congressman Gore's question when he talked about the hugeness of the C-5A contract and the hugeness of the SPR contract in terms of billions

and billions and billions, is that of the \$25 billion associated with the SPR, a good \$22 billion was in oil which is a national treasure. Regardless of the price, you have to buy the oil today or next year or the following year. And that the construction aspects of this were \$3½ billion. But that really \$1½ billion are invested in phase I and phase II and that if you then go another 500 million barrels turnkey at that price, you are talking, \$1½ billion, \$2 billion, I say, yes, we are.

Mr. DINGELL. You are then discussing having the balance of the program cost about \$1½ billion if you go the full 100 million barrels.

Mr. DELUCA. Billion barrels?

Mr. DINGELL. Billion barrels. Talking about that costing you an additional \$1½ billion.

Mr. DELUCA. Yes, sir. Because, you see, as we are saying here, the first 500 million barrels, regardless of those original prices of \$1.53 and so forth, the way we are netting out now, sir, that is going to cost about \$3 a barrel. OK? About \$1½ billion for the first 500 million.

Mr. DINGELL. You are talking about the same amount for the next 500 million.

Mr. DELUCA. The next 500 million considering escalation forward is bound to cost you a little more, that is what I am saying.

Mr. DINGELL. All right. What I am trying to do is get a handle on what your judgments are.

Mr. DELUCA. Well, again we like to negotiate with industry for the same reason you do—

Mr. DINGELL. Without telling them how much it is going to cost.

Mr. DELUCA. Yes, sir.

Mr. DINGELL. All right.

Mr. DELUCA. But you have to stay in that ball park of somewhere between \$3-\$3.50. Going in on the negotiations. We are like you—

Mr. DINGELL. We are not trying to get into it. I am not sure if you were to tell what the overall cost is, industry would know what you are prepared to pay for a barrel stored because you are talking about different costs that go into making up that figure.

Mr. DELUCA. Our preference of course is come in on a lease basis or rental basis. That would make us a lot more competitive and should give a great deal of comfort to all of us. I believe that is the way they will come.

Mr. DINGELL. On rental?

Mr. McISAAC. Also, Chairman Dingell, if you were to look at our oil storage program as being a strategic stockpiling program, I am of the understanding that most of those stage stockpiling programs in which this country has engaged in the past years, not most but a significant portion of it, perhaps the great majority has been of having people performing the warehousing function for the Government. In a sense this is a warehousing function.

Mr. DELUCA. If we can get good rental submittals, storage service, competitive, oversubscribed, we can zero in on the cost.

Mr. DINGELL. Oversubscribed?

Mr. DELUCA. Oversubscribed. Say, we need 300 million barrels or 400 million barrels and the competition comes in at 900 or one billion one.

Mr. DINGELL. That is if they have the holes in the ground.

Mr. DELUCA. Or will create them.

Mr. DINGELL. I think this is a little different because if somebody doesn't create them, you can't say you have the competitive situation there. But if you have three or four people saying we will put you a hole in the ground to take care of 900 million, and you say we have only 300 million to store, I know of nobody this side of a mental institution that is going to go out and spend the kind of money you are talking about spending to leach caverns of this size if he doesn't have a contract for storage. So you can't tell me that you are going to be having oversupply once you have let the contracts. You may have offers to oversupply. I do not find that the result of your contract to lease as leaving you with an oversupply of space in hand.

Mr. DELUCA. No, sir; it is the oversupply at the point of negotiation.

Mr. DINGELL. That is not oversupply at the point where the oil goes into the ground.

Mr. DELUCA. That is true.

Mr. DINGELL. One can hardly say that the fact that you have offers to provide service in excess of the amount that you want is actually in fact constituting an excess of supply once the contracts are let.

Mr. DELUCA. I agree with your distinction. The only point is we are in a more beneficial position if we have got an oversubscription in the offering, until we get in a competitive framework.

Mr. DINGELL. Mr. McIsaac.

Mr. McISAAC. Congressman Dingell—and Hillary, please guide my remarks if I step beyond the proprieties of the procurement process—but quite frankly, even before we had discussions with the people who may be giving us proposals for this new capacity, we thought of this, and I think these discussions have borne this out, as being a process whereby a number of organizations would be submitting proposals to us, each one submitting a proposal that could range anywhere from 40 million barrels of capacity to 150, 200 million barrels of capacity. Some of this capacity will be in existing caverns, in salt domes, some of the capacity will likely be new leached caverns, some of the capacity will be in various types of mines that exist in the United States, salt mines, limestone mines, granite caverns that exist, perhaps even marble mines.

So we are in a position in receiving these proposals that in my judgment is going to be uniquely advantageous to the Government. We have a position whereby we can assess various kinds of facilities on a cost basis, on a schedule basis, developed through different routes by people that own the facilities, people that have an interest perhaps. For example, in the brine disposal process we hope there will be some proposals to us to utilize the brine for various chemical feedstocks rather than having to inject the brine through the deep injection well process, which is giving us such a difficult problem at the moment.

So we think out of this potential array of offerings submitted to us on a competitive basis, we can in fact cherry pick the best and most advantageous kinds of offerings for our purposes.

Mr. BARRETT. Mr. DeLuca, in your prepared testimony on page 3, you talk about the difficulty of the terrain in the Atchafalaya Basin.

Now, I understand that that basin is in fact honeycombed with existing oil pipelines and gas pipelines, that it is sort of fairly well known what the terrain is.

Mr. MAZUR. Well, we are following for the part of the way existing pipeline. To the extent that we are crossing the Atchafalaya River, which is a very deep river, and having to dredge new canals, for flotation of the pipe and so forth, the basin is very difficult. The terrain is flat, but it is very difficult, trees, swamps, woods.

Mr. BARRETT. My suggestion however is that it is a known art, it is nothing new, that it has been done by others before.

Mr. MAZUR. Yes, because there are pipelines out there.

Mr. BARRETT. Now, who is building this line or who was building it?

Mr. MAZUR. Bannister.

Mr. BARRETT. This is Bannister, the contractor—

Mr. MAZUR. This was a fixed price contract under Bannister by Parsons-Gilbane for the pipeline.

Mr. BARRETT. The fixed price contract was for what, \$27 million?

Mr. MAZUR. Yes.

Mr. BARRETT. And it is now pricing out at \$63 million.

Mr. MAZUR. Right. We have not done that, no. We have terminated the Bannister contract after completion of the basin part of the job on the basis that there have been land acquisition delays which precluded continuation with the construction project outside of the basin. Within the basin we have encountered some land acquisition problems of overlying easements that cause the problem.

Mr. BARRETT. Is Bannister going to get \$27 million?

Mr. MAZUR. We have not negotiated a close out for that termination with Bannister. The answer to your question right now is that is under negotiation. We haven't even gotten a proposal from Bannister for the close out.

Mr. BARRETT. Has Bannister lived up to its description of work?

Mr. MAZUR. Has Bannister? We are disappointed with Bannister in their work, what work they have done.

Mr. BARRETT. In other words, they have not lived up to the description of work.

Mr. MAZUR. That is true. That is also one of the reasons why we are terminating.

Mr. BARRETT. Is Bannister going to lose money on this pipeline?

Mr. MAZUR. I can't honestly answer that. We have not finished the settlement and I have no basis to say yes or no on it.

Mr. BARRETT. Mr. DeLuca, you heard Mr. Fitzgerald's testimony with respect to the cost tracking.

Would you agree with him that cost tracking is a proper management tool for following up on costs and so on?

Mr. DeLUCA. Absolutely.

Mr. BARRETT. We asked a number of people all last week for cost tracking data on the contracts and we were told there was no such document or no series of documents; is that correct?

It is correct that we were told that. Am I correct that there are no such documents?

Mr. DeLUCA. May I let our procurement contracting officer, Ted Siomporas, answer that?

Mr. SIOMPORAS. The information which you asked for was our top 100 contracts, contracts in size. If you recall General DeLuca's discussion of the evolution of the contracting approach, much of what you had asked for were formerly FEA contracts and some which had been let out of Washington, the bulk of which were inherited in New Orleans. The information which you had asked for got to me on Wednesday. We had to pull our files out of retirement. Many of these files we frankly had never seen before because you were talking about past history, several years ago. And there was no recordation of costs in any one place. It had to be physically pulled out of the files. So the information which I telephoned up to you was what we had gathered out of those files through the painstaking process of pulling them out of the files and going back to day one.

Mr. BARRETT. Your answer I guess is that there was not a cost tracking system with respect to the keeping a record of contract costs and escalations?

Mr. LANGMEAD. No, that isn't true. What we have in those books in front of General DeLuca is basically our cost tracking reporting system. The problem we had is what Ted expressed. You asked for data showing the original estimate for the contract, the amount, the value that the contract was awarded and what the current estimate to completion is. What Ted was expressing was the difficulty in pulling all of that historical data together in that format. Those books have every contract which has been awarded and our contemplated procurements laid out, the work package format for each site and each phase of the program within that site. And they tracked to the baseline plans that were developed in the previous discussions, March, April, May, June time frame.

Mr. BARRETT. I don't recall that this document that you are referring to shows original estimate and then the value of the contract.

Mr. LANGMEAD. No; I admit these books do not have that data in it. As I said, we did not have the data in the format that you asked for. But the evolution of the cost estimates, the discussions before about the red book and all, that has been an evolving process all the way back from the time the program started in FEA.

Ted mentioned a lot of those contract files were in retirement. To pull all that information together in that format has been the problem. It is not that the data does not exist or that we have not been managing the data and reporting it in that fashion, to our baseline which has been established since the project office has been established.

Mr. BARRETT. Mr. DeLuca, does that comport with your understanding of what cost tracking is in traditional terms?

Mr. DeLUCA. Mr. Barrett, I would say the cost tracking system that we have in the SPR is in need of improvement.

Mr. BARRETT. And I gather steps are going to be taken to manage it?

Mr. DELUCA. Yes; actually we have gone through a cost recordation phase and now we are beginning to move into the management of that, including cost control. I would not stand here based with integrity in my previous experience to say that we have a sophisticated cost tracking management system.

Mr. BARRETT. One question about cavern No. 6 at West Hackberry.

The General Accounting Office report for August 14, 1978, talks about the fact that the cavern was originally supposed to be pressure tested to 730 psi. As a matter of fact, it was actually pressure tested to 710. The General Accounting Office people were told it didn't matter because that was still 30 percent above maximum allowable operating pressure, and if I compute that, that would mean the operating pressure was around 500 psi. At the time of the fire it was operating at 650 psi.

Mr. SCANGO. The original certification programs were set up before we bought the site based on data that we thought we were going to find there. Our certification data was based on so much pressure per foot of depth. We adjusted those programs when we got in there and found out. The data that was given you is correct, those caverns were certified to 30 percent over what the working pressure was to be. It was just that the data they were working from was projected data and we had indicated that was not the actual case we found.

Mr. BARRETT. What was the operating pressure supposed to be?

Mr. SCANGO. I will have to find out the exact data on cavern No. 6. But the operating pressure of that cavern is well above what it was operating at at the time of the fire.

[The following information was received for the record:]

CAVERN NO. 6 PRESSURE DATA

Cavern No. 6 was certified at 715 PSIG using 1.2 specific gravity brine. Under oil conditions (S.G. .876) and the appropriate safety factors the maximum allowable operating well head oil pressure is 877 PSIG.

Mr. BARRETT. In your report to Chairman Dingell on October 20, there is no mention that you changed the operating data.

Mr. SCANGO. You asked two types of questions here. First of all, you are asking a question that concerns itself with the data of the certification, which says we started out to do something and we did something else. What I am indicating is that the lesser pressure that was tested was still within the realm of what we intended to pressurize but we found out the physical conditions were different and we adjusted the program. The cavern was operating at the pressure that was allowed.

Mr. BARRETT. Did you give permission to the operator to vary, to increase the pressure above 500 or 525?

Mr. SCANGO. We made several adjustments throughout the certification program to suit the conditions we found. It wasn't an operating question. It was a test question that happened a year before.

Mr. DINGELL. If I read the history of this correctly, you had proposed originally that the cavern be functioning at 732 psi. Then it was tested at 710; now, is that correct?

Mr. SCANGO. I will have to check that, sir. I am not exactly sure of the numbers.

[The following information was received for the record:]

CAVERN PRESSURE DATA

The cavern actual certification pressure was 715 PSIG using a 1.2 specific gravity brine.

Mr. DINGELL. Now, this was supposedly to be functioning—this test was approximately about 30 percent above the maximum planned operating pressure.

Now, I gather that that maximum operating pressure would have been 497 psi. Then I gather it was actually functioning at 650 at the time of the failure. Now maybe you want to tell me whether I am correct later on for the purpose of the record, but I understand that is the history of the matter.

Mr. McISAAC. We will be happy to do that, Mr. Chairman, for the purposes of the record.

Mr. DINGELL. In any event it blew out at 650 which was less I guess than the 710 but which was more than the level that you proposed to operate it at, at 497.

Now the question then comes down, am I correct in this appreciation, and I believe I am, and if I am, why were they operating at 650 instead of 497, which was the planned operating pressure?

Mr. McISAAC. I would like to submit that for the record, if I could, Mr. Chairman.

Mr. DINGELL. That would be helpful. I would also like to know who said to do it. Because we burned up a powerful lot of oil and got ourselves into some splendid lawsuits.

[The following information was received for the record:]

CAVERN No. 6 OPERATING PRESSURE

Cavern No. 6 was hydrostatically tested at a well head pressure of 715 PSIG using a brine of specific gravity 1.2. After certification, the working fluid was a crude oil with a specific gravity conservatively estimated at .876. The cavern and casing under oil conditions permits operation at higher well head pressures without exceeding the absolute pressure that the casing seat and cavern experienced during the certification program. On June 30, 1978, a new set of operating pressures was transmitted to our Operating Contractor for his implementation. These figures corrected for the specific gravity of the fluids (S. G. .876) and applied a safety factor to ensure cavern integrity. It should be noted that the oil contained in cavern No. 6 had a specific gravity of .8587. The operating pressure was recommended by the Executive Engineer, Gulf Interstate Engineering Company.

Mr. McISAAC. Don, do you have anything further to add?

Mr. MAZUR. One thing that I think should be mentioned is, I don't know where the 650 pounds came from, but at the West Hackberry hearing, we had expert testimony, Mr. Chairman, regarding the pressure that was obtained at the time the bridge plug that was defective blew out of the 5½-inch brine string, and I believe that the testimony was that that pressure was slightly less than 400 pounds.

Mr. DINGELL. Something less than 400.

Mr. MAZUR. That is correct.

Mr. DINGELL. Maybe I am incorrect. That worries me, too. If it was operating at less than 400 pounds and she blew when she was supposed to function at 497, then one must ask what was going on if that happened?

Mr. LANGENKAMP. Well, there is no question that there was a mechanical failure of some sort involving this bridge plug. As the fire report indicates, the mechanical plug in this 5½-inch string of pipe came out. And the cause for it coming out is debated. But there is no question but what the pressure was not in excess of 500 pounds.

Mr. DINGELL. Then the question is, are you going to design these things so that you get yourselves essentially a blowout preventor or some kind of a fail-safe mechanism so that if a plug blows, you will have a redundant system to prevent the kind of events we saw down in West Hackberry; is that going into engineering?

Mr. LANGENKAMP. At the present time fail-safe systems for drilling into caverns are being developed.

Mr. DINGELL. But are they in the same place as the equipment that failed, or are they elsewhere?

Mr. LANGENKAMP. The equipment——

Mr. DINGELL. Are they at the same place in the system?

Mr. LANGENKAMP. Yes; the item that failed was an item involved in the process of drilling into a cavern. It was not an item of permanent equipment. It was part of the drilling operation.

Mr. DINGELL. We would appreciate some response on that.

[The following information was received for the record:]

EQUIPMENT THAT FAILED AT WEST HACKBERRY

The equipment that failed in the West Hackberry incident was an inflatable packer. A packer is a device used in the drilling industry to seal off the interior of a pipe string during drilling or workover operations. The packer prevents the flow of liquid through the pipe string while, for example, the pipe is being removed or while work is being performed on the wellhead piping. At West Hackberry the packer was set near the bottom of the pipe string and heavy drilling mud was pumped on top of the packer. The packer and weight of the mud was to have held the cavern pressure in check while the pipe string was being removed. For some undetermined reason the packer slipped inside the pipe which caused the mud and subsequently oil to flow up the pipe string to the surface. Attempts to set a safety valve were unsuccessful in time to stem the mud and oil flow and counteract the packer failure.

The packer was only being used during the pipe string removal and was not a permanent part used during operations of the oil storage cavern. Workover procedures have been notified to provide redundant safety devices to prevent such an accident in the future. Proper safety valves, bridge plugs and blowout preventers are being installed on all cavern well heads and caverns during workover operations.

Mr. DINGELL. The Chair recognizes Mr. Barrett.

Mr. BARRETT. In the letter inviting you gentlemen to testify, there were a number of things that the committee requested, some of which have been provided, and I would like to go over, for the sake of the record, the things that still remain to be provided.

We asked for information with respect to the cost overruns, item No. 2, in the letter. And that information I understand is still being——

Mr. McISAAC. We have that information with us today, Mr. Barrett, and we will give it to you.

Mr. BARRETT. Thank you.

Mr. DeLUCA. I will hand it to you, Mike.

Mr. BARRETT. Fine. Thank you.

[The information referred to follows:]

LARGEST 100 SPR CONTRACTS SHOWING THE ORIGINAL ESTIMATE, THE CONTRACT PRICE AND ACTUAL COST

CONTRACT NO.	CONTRACTOR	DESCRIPTION	INITIAL ESTIMATE AND VALUE	INITIAL AWARD	ESTIMATE AT COMPLETION
DE-AC96-78PO07137	Parsons-Gilbane	Const. Management	48,500,000	30,000,000	320,900,000
DE-AC96-78PO02837	Sunoco Terminals, Inc	Marine Terminal facilities & services	21,208,000	32,254,000	33,345,563
DE-AC96-78PO07137	Parsons-Gilbane (Expansion)	Const. Management	31,600,000	31,600,000	385,200,000
DE-AC96-78PO0006	Koch Oil	Marine Terminaling & Transportation Services	49,990,000	20,000,000	13,900,000
DE-AC96-78PO02844	H.C. Price, Co.	42" pipeline from W. Hack. to Sun. Terminal	18,419,921	12,877,200	23,163,634
DE-AC96-78PO07131	Glaser Const. Co.	Piping Systems, WH	7,518,715	13,713,000	14,793,918
DE-AC96-78PO02789	Houston Const., Inc.	38 mil. 36" pipe BC to St. James	11,461,467	12,498,050	15,495,529
DE-AC96-78PO08786	Bethlehem Steel Corp.	Line pipe, Beaumont Texas & Plaquemine Louisiana	19,906,000	10,390,378	11,390,378
DE-AC96-78PO08783	Parsons-Gilbane	Const. Management	63,000,000	10,000,000	8,045,912
DE-AC96-78PO00013	S & B Constructors	Piping; site prep Construction	13,189,674	9,800,000	9,558,610
EL-78-C-01-2717	Allied Chemical	Provide fuel oil	8,501,784	8,332,875	8,332,875
DE-AC96-78PO02804	Anchor-Wate	Corrosion & concrete coating of line pipe	7,790,300	8,185,489	7,257,211
DE-AC96-78PO10023	Koch Oil	Marine Terminalling Services	N/A (part of 00006)	8,200,000	8,200,000

CONTRACT #	CONTRACTOR	DESCRIPTION	INITIAL ESTIMATED VALUE	INITIAL AWARD	ESTIMATED AT CLOSE OF YEAR
EL-78-C-01-8824	Armco Steel Corp	Manufacture 36" line pipe	15,174,066	6,903,181	6,903,181
EL-77-C-01-8818	PB/KBB	Site Development	8,000,000	6,100,000	16,231,430
DE-AC96-78PO02845	Pentzien, Inc.	WH-3 Sabine & Neches River Crossing	5,708,832	6,040,000	9,865,271
DE-AC96-78PO07205	Beckman Const. Co.	ESR Electric	5,785,028	5,978,000	3,755,915
EL-77-C-01-8805	Armco Steel Corp.	300,000 line-craft of 36" OD high-test pipe	Unknown	5,882,708	6,817,175
DE-AC96-78PO07100	Instrument Control Services, Inc.	Instrumentation Control System for 3 Sites	4,500,000	5,878,991	7,446,682
EL-77-C-01-8812	Armco Steel Corp.	Furnish line pipe	Unknown	5,678,772	5,678,772
DE-AC96-78PO02823	Glaser Const. Co.	Site prep for early storage reserve	6,650,000	5,469,256	6,198,414
DE-AC96-78PO07175	Morton-Norwich (Letter K)	Mine conversion const.	10,000,000	5,000,000	40,841,659
DE-AC96-78PO08819	Anchor-Wate	Concrete coating of pipe & trans.	5,050,820	4,966,355	4,986,412
DE-AC96-78PO07207	Beckman Const. Co.	ESR Buildings	2,645,036	4,493,000	4,443,286
DE-AC96-78PO07114	Cactus Drilling Corp.	Drill Re-entry wells & 5 brine disposal wells	4,175,000	4,175,000	4,175,000
DE-AC96-78PO07203	Cactus Drilling Corp.	Drill (2) solution cavern wells	6,500,000	4,069,000	4,069,000

CONTRACT #	CONTRACTOR	DESCRIPTION	INITIAL ESTIMATED VALUE	INITIAL AWARD	ESTIMATE AT COMPLETION
DE-AC96-78PO02796	Gulf Interstate Engineering Co.	Exec. eng. design of complex BM, WH, BC, WI, CB, Iron Run, Klear Mine Central Rock	6,000,000	3,960,000	16,158,448
EL-77-C-01-8804	Bethlehem Steel Corp.	Well casings	7,108,380	3,921,596	3,921,596
EL-77-C-01-8815	Gregory & Cook	BM Pipeline	5,293,700	3,650,700	4,398,834
DE-AC96-78PO07204	Cactus Drilli. Corp.	Drill 9 solution caverns	3,375,000	3,375,000	3,375,000
EL-77-C-01-8796	Nordix, Inc.	Marine terminal-ling services	12,000,000	3,360,737	3,360,737
DE-AC96-78PO08809	Brown-Minn. Tank & Fabrication Co.	4-200 M gallon tanks	3,115,000	3,097,000	4,002,173
DE-AC96-78PO02816	Corps of Engineers	Interagency Agreement for real estate acquisition	75,000,000	3,000,000	
DE-AC96-78PO07117	PE/KBB	3rd party service & well drilling super. for the drilling of re-entry & brine disposal wells	6,500,000	3,000,000	14,005,255
EL-77-C-01-8817	Glaser Const.	Const. of WH-1 Intermediate Fill Program	1,300,000	2,690,388	2,682,548
DE-AC96-78PO00011	S&B Constructor	ESR Buildings	2,556,428	2,500,000	2,483,154
DE-AC96-78PO07106	Cactus Drilling Corp.	Drill 5 re-entry wells & 4 brine disposal wells	2,490,000	2,490,000	2,490,000

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<u>CONTRACT #</u>	<u>CONTRACTOR</u>	<u>DESCRIPTION</u>	<u>INITIAL ESTIMATED VALUE</u>	<u>INITIAL AWARD</u>	<u>ESTIMATE AT COMPLETION</u>
DE-AI96-78FO07150	NAVFAC	IAA for oil spill control equip, and tech. service	2,356,228	2,356,228	2,356,228
DE-AC96-78FO08828	Coastal Towing, Inc.	Barging Serv.	12,300,000	2,300,000	4,853,000
DE-AC96-78FO07206	Beckman Const. Co.	ESR Electrical	1,800,000	2,129,917	2,084,475
DE-AC96-78FO00009	Drillers Inc	Well Drilling	2,003,500	2,003,500	2,003,500
DE-AC96-78FO02803	Flow Control Div. of Geosource	Provide Pipeline Gate Valves, and Operators	3,505,200	1,882,279	1,933,820
DE-AC96-78FO08870	Seaway Pipeline, Inc.	Marine Terminal-ling services	8,990,000	1,800,000	9,609,200
DE-AC96-78FO07215	Wallace Eng., Inc.	Drill 7 wells	2,405,000	1,778,000	1,778,000
DE-AC96-78FO00012	Frauman/Beacon Meldrum	Electrical	2,860,802	1,750,000	1,581,433
DE-AC96-77FO08833	Mid-Continental Supply Company	Well castings	1,680,000	1,665,879	1,665,879
DE-AC96-78FO07212	Welsh Drilling & Ser.	Drill 7 brine disposal wells	3,885,750	1,617,600	1,617,000
DE-AC96-78FO02814	Walk, Haydel & Assoc. Inc.	Design of St. James Terminal	1,700,000	1,465,000	2,423,360
EL-77-C-01-8809	U.S. Steel	Line pipe	1,700,000	1,427,213	1,159,467
EL-78-C-01-2818	R.B. Potashnick	Brine pit & oil tank foundation	1,350,381	1,412,000	1,545,122
EL-77-C-01-8801	Bingham Willamette Co.	Modify spare pumps rotating elements	1,695,000	1,379,177	1,397,720

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CONTRACT #	CONTRACTOR	DESCRIPTION	INITIAL ESTIMATED VALUE	INITIAL AWARD	ESTIMATE AT COMPLETION
EL-78-C-01-1799	S&B Constructors	Clearing & grubbing, const. of roads, containment areas & well pads	2,145,000	1,340,000	1,740,000
EL-77-C-01-8830	U.S. Steel Corp	Pipe for BC	1,097,400	1,300,361	1,300,361
EL-77-C-01-8816	Armco	Line pipe (Supply K)	2,300,000	1,290,350	1,316,828
EL-78-C-01-7105	Cactus Drilling Corp.	Drill 5 re-entry wells	1,228,975	1,228,975	1,433,557
DE-AC96-78POO7166	Daniel Systems Eng. Co.	Custody Trans. metering system	989,352	1,203,608	1,254,978
EL-77-C-01-8907	M & J Valve Co.	24" to 42" 50 to 400 class gate valves & operators	1,177,837	1,177,837	1,177,837
EL-77-C-01-8799	Bingham Willamette	Installation of centrifugal pumps w/ elec. motors	1,329,000	1,156,811	1,166,811
DE-AC96-78POO7102	Borg Warner Co.	Submersible pumps	700,000	1,156,353	1,424,353
DE-AC96-78POO8797	Allied Chemical	Barge dock terminal-ling	3,780,000	1,100,000	3,124,547
DE-AC96-78POO2801	Dow Chemical	Brine removal	120,000	1,080,000	3,120,000
EL-78-C-01-7196	PB/XBB	Salt dome geology & stability analys.	975,000	975,000	975,000
DE-AC96-78POO7116	Fenix & Scisson, Inc.	Architect-Eng. des. on-site facilities for crude oil storage	1,763,565	900,000	3,364,171

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CONTRACT #	CONTRACTOR	DESCRIPTION	INITIAL ESTIMATED VALUE	INITIAL AWARD	ESTIMATE AT COMPLETION
EL-77-C-01-8812	Iberville Service, Inc.	Intermediate fill const.	1,131,000	845,247	963,860
DE-AC96-78PO07197	Mac Drilling	Drill 3 re-entry wells	1,342,000	842,000	842,000
EL-78-C-01-7120	Bingham-Williamette Company	Procurement of horizontal centrifugal pumps with motors	2,246,000	746,821	746,821
DE-AC96-79PO10001	DUCI	Phase-in operations and maintenance	800,000	735,700	933,221
EL-77-C-01-8834	Oil Well Div., US Steel	Well casings	720,000	681,973	681,973
DE-AC-96-78PO10018	PetroUnited	Marine Terminaling Services	1,734,575	675,000	675,000
DE-AC96-78PO00007	Gulf States Inc.	Const of Elec. sub-workover	859,859	673,300	674,750
EL-77-C-01-8802	Peabody Floway, Inc.	Vertical pumps & elec. motors	835,000	657,533	688,088
EL-78-C-01-7103	Customs Controls	Manufacture test inspect & supply control valves and actuators for water and oil service	482,600	648,233	649,489
EL-77-C-01-8814	R.B. Potashnick	Intermediate Fill const.	615,000	615,000	855,322
EL-77-C-01-8808	Mutual Mfg. & Supply	Manufg. testing, inspecting & supply fittings	1,124,105	600,000	600,000
DE-AC96-78PO07220	Progress Drilling	Drill 2 brine disposal wells	1,615,000	599,040	3,813,080

<u>CONTRACT #</u>	<u>CONTRACTOR</u>	<u>DESCRIPTION</u>	<u>INITIAL ESTIMATED VALUE</u>	<u>INITIAL AWARDS</u>	<u>ESTIMATED AT COMPLETION</u>
DE-AC96-78FO02794	Gulf Interstate Engineering Co.	Design of pipe-line connecting WI & SUT	645,000	590,000	757,092
DE-AC96-78FO07125	Continental EMSCO	16" type loading arms	1,410,000	549,210	585,810
EL-77-C-01-8798	Bethlehem Steel Corp.	Pipe for BC, BM, WH	2,300,000	544,368	269,066
DE-AC96-78FO07219	Wallace Engineering Inc.	Drill 7 wells	1,615,000	508,000	475,000
EL-78-C-01-2810	Bingham Willamette Company	Horizontal split case pumps & motors	406,000	504,916	504,916
DE-AC96-78FO00024	National Marine Serc.	Barge Towing	500,000	500,000	250,000
EL-78-C-01-7110	C G I	Switch gear control centers	773,000	490,000	560,142
DE-AC96-78-78FO02827	Midco Control Sys. Inc.	Elec. power dist. & control equip,	583,000	487,964	622,168
DE-AC96-78FO02826	Midco Control Sys. Inc.	Elec. power dist. & control equip.	617,000	464,685	626,685
EL-78-C-01-7142	Bingham-Willamette Company	Horiz. centrifugal pipe pump w/ motors	998,000	453,576	459,576
DE-AC96-78FO02799	Resouce Planning Assoc. Inc.	Develop. of operational plans for fill and withdrawal	488,456	408,525	900,000
EL-78-C-01-7122	Custom Controls Co.	Flow & control valves	424,000	401,919	401,919
DE-AC96-78FO00020	Cameron Parish Police Jury	Repair Cameron Parish Roads	450,000	388,962	388,962
DE-AC96-78FO00005	American Well Serv.	Workover Rig	382,000	376,000	376,000
EL-77-C-01-8836	Cactus Drilling	Drill re-entry well 6b "	374,000	374,000	374,000

<u>CONTRACTOR #</u>	<u>CONTRACTOR</u>	<u>DESCRIPTION</u>	<u>INITIAL ESTIMATED VALUE</u>	<u>INITIAL AWARD</u>	<u>ESTIMATE AT COMPLETION</u>
DE-AC96-78P000023	SBA (Gulf Water Towing, Inc.)	Barging Service	2,800,000	345,000	1,100,000
EL-77-C-01-8908	Kaiser Steel	Furnish Pipe	1,097,000	340,509	1,320,652
DE-AC96-78-P000001	Morton-Norwich	Use of man cage in production shaft to include operators	471,350	309,601	454,776
DE-AC96-78P007107	Ford, Bacon & Davis	Architect-eng. design of crude oil & brine pipe-lines	3,750,000	300,000	2,563,285
EL-77-C-01-8810	Seaboard Wellhead Control, Inc.	Wellhead equipment.	448,400	290,348	290,348
EL-78-C-01-0010	Pelican Well Service	Workover Rig	257,000	256,000	256,000
DE-AC96-78P008827	Sunoco Terminals Inc.	Marine Terminal services to receive crude oil & load barges for shipment to Allied Chemical Co.	12,300,000	250,000	3,800,000
EL-78-C-01-8823	Daniel Systems Eng. Company	Vertical turbine submersible pumps	280,000	219,114	306,008
DE-AC96-78P000017	SBA (Gulf Water Towing Co., Inc.)	Barge Towing	6,200,000	200,000	758,800
DE-AI96-78P002811	GSA	Utility Service		173,000	
DE-AB96-78P000015	International Matex Tank	Temporary storage	600,000	165,000	570,000
DE-AC96-78P008795	Amoco Pipeline Co.	Barge dock terminaling	1,800,000	100,000	2,366,000

S U M M A R Y

COMPETITIVE

Number of Actions (155)	Total Amount \$628,929,443
With Original (155) Parsons-Gilbane Contract Estimate \$48,500,000	Total Amount \$358,413,430

8a

Number of Actions (4)	Total Amount \$ 2,294,603
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NONCOMPETITIVE

Number of Actions (30)	Total Amount \$ 94,683,449
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IAA

Number of Actions (5)	Total Amount \$121,679,055
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COMPETITIVE

<u>Contract Number</u>	<u>Value</u>
2794	\$ 685,617
2796	14,019,697
2814	1,465,000
7107	1,056,400
7116	1,769,632
8818	11,908,160
7137	
(1st letter contract)	48,500,000
(at 12/16)	317,859,760
2804	8,187,489
7100	5,878,991
7102	1,156,353
8809	3,676,528
8819	4,966,355
0007	673,700
0011	2,500,000
0012	1,750,000
0013	9,800,000
0020	450,000
2789	15,494,929
7131	14,213,000
7205	5,978,000
7206	2,629,917
7207	4,493,000
7106	2,490,000
7114	4,175,000
2837	33,345,563
8827	3,267,500
0014	-0-
0015	570,000
0028	-0-
0029	-0-
0030	-0-
0031	-0-
0034	-0-
0022	12,960
2799	843,378
7195	30,000
0001	933,221
7117	13,175,255
7196	975,000
8783	24,000,000
2803	1,882,280
2810	504,916
2812	89,729
2826	464,685
2827	487,964
7103	649,489
7110	560,142
7119	22,671
7120	746,821
7122	401,919
7124	254,391

COMPETITIVE (continued)

<u>Contract Number</u>	<u>Value</u>
7125	\$ 585,810
7142	459,576
7174	72,910
8786	11,320,652
8787	187,435
8794	98,398
8798	819,670
8799	1,166,811
8800	72,858
8801	1,379,727
8802	688,088
8803	108,339
8804	3,921,596
8805	6,800,175
8808	600,000
8810	290,348
8816	1,292,829
8817	62,958
8820	96,826
8823	306,008
8824	6,903,181
8829	51,493
8830	1,300,360
8833	1,665,879
8834	681,973
8835	40,789
8837	17,771
8838	103,517
8907	1,171,837
8908	340,508
8909	1,159,467
8910	4,394,000
8911	20,899
8912	5,678,722
2818	1,562,512
2823	6,987,393
2844	15,987,220
2845	7,193,440
7199	1,340,000
8791	261,000
8812	897,813
8813	2,835,798
8814	855,322
8815	4,156,978
7105	1,433,556
0024	500,000
8796	3,360,737
<u>8828</u>	<u>4,853,000</u>
TOTALS	99 \$628,929,443

NONCOMPETITIVE

<u>Contract Number</u>	<u>Value</u>
7166	\$ 1,203,608
7175	20,038,850
0009	2,003,500
7197	842,400
7203	4,069,000
7204	3,375,000
7212	1,617,000
0006	13,090,000
8795	2,366,000
8797	3,124,547
8870	9,609,200
0023	8,200,000
0001	464,775
2717	8,332,875
2801	2,100,000
2819	32,640
0022	70,951
0016	186,855
0005	376,000
0008	256,000
0010	265,000
7215	1,778,000
7219	508,000
7220	3,813,080
8836	374,000
8906	232,000
0018	675,000
8832	5,608,617
2790	19,900
<u>0024</u>	<u>230,300</u>
TOTALS	\$ 94,683,449
	30

8a

	<u>Contract Number</u>	<u>Value</u>
	0017	\$ 752,000
	0023	1,095,000
	0002	249,799
	<u>0003</u>	<u>197,804</u>
TOTALS	4	\$ 2,294,603

IAA

<u>Contract Number</u>	<u>Value</u>
2811	\$ 13,072,665
2816	106,037,162
7135	165,000
7150	2,356,228
<u>8830</u>	<u>48,000</u>
TOTALS	\$121,679,055

CONTRACT NUMBER	ORIGINAL ESTIMATE	AWARD AMOUNT	CONTRACT NUMBER	ORIGINAL ESTIMATE	AWARD AMOUNT
1. 00013	\$13,189,674	\$ 9,800,000	51. 02845	5,708,832	6,040,000
2. 08818	13,830,000	6,100,000	52. 02789	11,461,467	12,498,050
3. 07131	7,518,715	13,713,000	53. 02844	18,419,921	13,877,200
4. 08812	1,131,000	845,247	54. 7120	2,246,000	746,821
5. 07116	1,763,565	900,000	55. 8783	11,158,000	10,000,000
6. 08813	1,300,000	2,690,388	56. 07137	48,500,000	48,500,000
7. 08814	615,000	615,000	57. 0020	450,000	388,962
8. 00009	2,003,500	2,003,500	58. 2794	645,000	590,000
9. 07125	1,410,000	549,210	59. 8834	720,000	681,973
10. 07100	4,500,000	5,878,991	60. 8798	2,300,000	544,368
11. 02803	3,505,200	1,882,279	61. 2796	6,000,000	3,960,000
12. 02827	583,000	489,964	62. 0001	800,000	735,000
13. 07197	1,342,000	842,000	63. 7102	-	1,156,353
14. 07203	6,500,000	4,069,000	64. 8809	3,115,000	3,097,000
15. 07204	3,375,000	3,375,000	65. 8804	7,180,380	3,921,596
16. 00712	3,885,750	1,617,600	66. 0007	859,859	673,300
17. 07215	2,405,000	1,778,000	67. 2826	617,000	464,685
18. 07205	5,785,000	5,978,000	68. 0012	2,860,802	1,750,000
19. 02823	6,650,000	5,469,256	69. 7175	5,000,000	5,000,000
20. 07207	2,645,036	4,493,000	70. 8786	19,906,000	10,390,378
21. 00024	500,000	500,000	71. 8815	5,293,000	3,650,700
22. 08796	Not Avail.	3,360,737	72. 0013	13,189,674	9,800,000
23. 08828	12,300,000	2,300,000	73. 7166	989,352	1,203,608
24. 02810	504,916	504,916	74. 0001	471,350	309,601
25. 07206	1,800,000	2,129,917	75. 7199	2,145,000	1,340,000
26. 08909	1,700,000	1,427,212	76. 0011	2,556,428	2,500,000
27. 08830	1,645,263	1,300,360	77. 8907	1,177,837	1,177,837
28. 00018	1,734,574	675,000	78. 8836	374,000	374,000
29. 08910	1,097,400	4,394	79. 8833	1,680,000	1,665,879
30. 02837	21,208,000	32,254,000	80. 7122	424,000	401,919
31. 08827	12,300,000	250,000	81. 8802	835,000	657,533
32. 08797	3,780,000	1,100,000	82. 7110	773,000	490,000
33. 08795	1,800,000	100,000	83. 8808	1,124,105	600,000
34. 02801	120,000	1,080,000	84. 2818	1,350,381	1,412,000
35. 02799	488,456	408,525	85. 7114	4,175,000	4,175,000
36. 07106	2,490,000	2,490,000	86. 7102	700,000	1,156,353
37. 08870	8,990,000	1,800,000	87. 8801	1,695,000	1,379,177
38. 08908	1,097,000	340,508	88. 8799	1,329,000	1,156,811
39. 07219	1,615,000	508,000	89. 7142	998,000	453,516
40. 07220	1,615,000	599,040	90. 7107	3,750,000	751,091
41. 00010	257,000	256,000	91. 8823	280,000	219,114
42. 00005	382,000	376,000	92. 8912	-	5,678,772
43. 07105	1,228,975	1,228,975	93. 8824	15,174,066	6,903,181
44. 08810	448,400	290,348	94. 8805	-	5,882,708
45. 00015	600,000	-0-	95. 8816	2,300,000	1,293,050
46. 00006	49,990,000	20,000,000	96. 7196	975,000	975,000
47. 08819	5,050,820	4,966,355	97. 2811	N/A	MOU
48. 02804	7,790,300	8,185,489	98. 7150	2,356,228	2,356,228
49. 00023	2,800,000	345,000	99. 2816	3,000,000	3,000,000
50. 00017	6,200,000	200,000	100.		

Mr. BARRETT. We also asked for the status of the withdrawal and capability plans and of contingency plans for emergencies. Can we have those, to the extent they exist?

Mr. HYSTAD. We can give you a status of the physical withdrawal capability in terms of when we expect to have that. We also can give you the status of the process of finalizing the decisions for contingency use planning. Those decisions have not been completed. We are working toward completing them over the next several weeks to have an SPR plan amendment submitted to the Congress in early 1979. But we can brief you as to what the major issues are and what are the options that are being considered.

[The following information was received for the record:]

STATUS OF THE WITHDRAWAL AND CONTINGENCY PLANS FOR THE SPR

Plans for using the SPR

The preparation for using the SPR in the event of an oil import interruption consists of two major elements: (1) establishing the necessary policy, regulatory and administrative framework for using the Reserve and (2) the physical facilities and operating plans to move the oil.

In the first area, DOE staff are now completing studies of alternatives and preparing recommendations for the Secretary's decision. It is planned to resolve these issues and submit an Amendment to the SPR Plan to reflect the decisions, in the first part of 1979. The three primary issues being considered, and some of the principal options being studied, are as follows:

1. Which refiners will have rights or obligations to receive SPR crude oil? Options include:

Allocate oil under a Crude Oil Allocation Program, so that DOE in effect becomes a "seller" on the Buy/Sell list, and those refiners with less than their share of available crude oil could buy SPR oil.

Enter into advance agreements with refiners to receive some of the SPR oil under specified conditions. If that results in those refiners receiving more than their share of available crude oil, they would become sellers on the Buy/Sell list of the Allocation Program.

Sell some of the oil on a competitive bid basis to U.S. refiners that have lost imports.

2. How will importers of product be assured of replacement supplies for lost product imports? Options include:

Allocate stored SPR products directly to importers or users.

Allocate additional crude oil to refiners that can produce replacements for lost product imports, and assign importers to those refiners.

Allocate crude oil to the product importers to permit them to arrange for refining.

3. What price will be charged for the SPR oil? Options include:

Charge average landed import price if there are no price controls in effect.

Charge less than world market prices if price controls are in effect, and provide for prices to refiners to be averaged under a price equalization system such as the Entitlements Program. Controlled SPR prices might be set at pre-interruption world prices, at the national average price for domestic and imported oil, or at a lower level intended to reduced the economic impacts of foreign oil price increases.

In the second area, physical distribution of the oil, efforts are now underway to develop the physical capabilities and management system to move SPR from the storage sites to users.

Mr. BARRETT. We also asked information with respect to the personnel staffing. We would like to know specifically the number of people authorized versus the number on board. I don't know whether it is easier to give it to us now.

Mr. DELUCA. I have 56 people authorized in the headquarters in my immediate office and there are 150 people authorized in my New Orleans office.

Mr. BARRETT. That is 150?

Mr. DELUCA. 150. That is a total of 206, Mr. Barrett. And the staffing at New Orleans at the present time is 117. And in the Washington office I am 11 short.

Mr. BARRETT. In other words, 45.

Mr. DELUCA. Yes.

Mr. McISAAC. I might add, Mr. Barrett, that the strategic petroleum reserve program has been exempted from the hiring freeze that currently exists in the executive branch, and we are proceeding to fill all of these spaces.

Mr. BARRETT. Which are approximately 40 slots, I gather.

Mr. McISAAC. Yes.

Mr. BARRETT. One of the comments that the General Accounting Office has pointed out is that you don't have any place to put oil in the event of another emergency, such as happened at West Hackberry. Then you had no place to put the oil and you had to truck it away.

Are there plans for dealing with those kinds of contingencies?

Mr. SCANGO. We have. One of the studies we presently have underway, which is one of the things we have learned, is that we need working caverns. We are looking to design an additional two to four caverns depending on the size of the site which will give us working caverns to allow the transfer of oil. On some sites, we have tankage, a considerable amount of above-ground tankage, which can be made available for this kind of a surge.

Mr. BARRETT. You didn't have that in West Hackberry but you are going to put it in place.

Mr. SCANGO. We didn't have it there.

Mr. BARRETT. That concludes my questions, Mr. Chairman.

Mr. DINGELL. Gentlemen, the committee thanks you for your assistance to our staff. The Chair does have just a couple of questions.

Have you run any analyses of the percentage of middle distillates in the oil, in the petroleum that has been procured?

Mr. HYSTAD. I am sorry, could you repeat the question?

Mr. DINGELL. Have you run an analysis or a judgment as to the—

Mr. HYSTAD. Yields, you mean?

Mr. DINGELL. As to the yields of the crude?

Mr. HYSTAD. Yes; that is right. We have yield estimates for all the crude that we are storing.

Mr. DINGELL. Does that conform with your plan originally made?

Mr. HYSTAD. Yes, it does. We are now reexamining the types of crude we are proposing to store, looking toward a potential situation where we may have an overall shortage and may want to increase the percentage yield of residual and distillates and decrease gasoline, to determine what type of crude we would store in that event. So we may, for a full billion barrel system, want to change the mix of crudes to have capability to increase yields of the distillates and residual.

Mr. LANGENKAMP. For the record, I would refer to page 269 of the original strategic petroleum reserve plan, January 1977, which breaks out the five types of crude and also breaks out the yields of each of these five types.

Mr. DINGELL. Have you comported to that, sir, in the conduct of the program to date?

Mr. LANGENKAMP. Yes.

Mr. DINGELL. Have you also done that as regards the gravity and sulfur content of oil?

Mr. HYSTAD. Yes.

Mr. DINGELL. Do you have plans in place as to the manner and the methodology of the distribution of this crude?

Mr. HYSTAD. We do not have final plans approved. We are in the process of finalizing decisions on that now.

Mr. DINGELL. Could you submit the plans and the figures in the questions just asked by the Chair for the staff so they can review those, please?

Mr. HYSTAD. We will discuss with them the issues and the options we are now considering on such things as the crude oil allocation program, the product allocation, price controls, and so forth.

Mr. DINGELL. Can you inform the Chair what are the effects of the OPEC oil price increase on your plans for procurement in terms of cost?

Mr. McISAAC. Mr. Chairman, we are just now finding out precisely what the impact of that OPEC price increase will be. As you know, that OPEC price increase is scheduled to occur in several stages. It starts January 1, I believe, if I am correct, with a 5-percent increase and ultimately winds up with a 14.4-percent increase against this year's baseline at the end of the year. Of course it will impact us as it relates to our planned purchase schedules and we will be happy to give that information to you as soon as we have it totally under our belt.

[The following information was received for the record:]

If OPEC had not raised its prices in 1979, the Department of Energy could have saved about \$850 million or roughly \$1.25 per barrel for the purchase of the remaining 680 million barrels of crude oil for the 750 million barrels Strategic Petroleum Reserve.

Mr. DINGELL. I am advised that the cost increase on your low sulfur sweet crude is higher than 14.49 percent, it actually runs more because they are going to establish differentials, as I understand it, as to crude.

You indicated that your demurrage is no longer going forward as regards tankers.

Mr. DELUCA. I would say we would be out of the demurrage posture in the month of January.

Mr. DINGELL. In the month of January.

Mr. DELUCA. Yes. Because now our flow stream is good with the cavern.

Mr. DINGELL. I see. You are talking about \$7 million to \$8 million a month in demurrage?

Mr. DELUCA. No, it was \$7 million to \$8 million for the past 18 months, however, the last 2 months of October and November were high months of \$2.4 million and \$2.1 million.

Mr. DINGELL. Do you have plans in place for security for this oil against theft by your contractors, oxidation, bacterial action, terrorist action?

Mr. MAZUR. We have used the services of Sandia Laboratory to perform what is called a threat analysis against the sites, and for that study, they have visited and surveyed industry to see their security measures. We have taken the input from that study, and we are factoring it into our construction program in terms of security guard forces, security arrangements with local law enforcement officers, fences, lights, and ultimately we will be more sophisticated in terms of electronic devices. But we have obtained and are using the threat analysis approach from Sandia as a base from which we are proceeding.

Mr. McISAAC. I might add, as a result of a visit Mr. Langenkamp and I made to the SPR sites along about the time you were referring to earlier, in March, April, this report was commissioned and generated, and immediately following the receipt of that report, we took some steps to assure against theft, primarily through the metering, the control of valve openings and the like, our delivery lines, double checking of what had been loaded on barge, what was taken off barges and what got into our caverns. We are proceeding to further develop these systems at the moment.

As a result of the West Hackberry fire and the investigation report which followed that fire, we also have commissioned, for some security aspects, a five-man internal DOE team that is going to give the report to me this Friday in draft form and subsequently in final form in the first week of January to take further steps that relate not only to safety, but as well as to security, and we will be implementing recommendations that will be coming from this team forthwith.

Mr. DINGELL. One of the things in the West Hackberry situation was called to my attention, the fact that you may have some security troubles on that site.

Mr. McISAAC. Mr. Chairman, I might add that in going over my earlier testimony, with regard to the security issue before this committee, that I saw that we were supposed to provide you with the security plan, and we will give you a copy.

[The following security plan was subsequently received for the record:]

SAND78-0769

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SECURITY FOR THE STRATEGIC PETROLEUM RESERVE

William K. Paulus, Vern E. Romesberg,
Robert C. Holt, Stephen C. Roehrig,
Ivan G. Waddoups



Sandia Laboratories

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SECURITY FOR THE STRATEGIC PETROLEUM RESERVE

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ABSTRACT

Security requirements and rationale are formulated to establish a basis for developing Strategic Petroleum Reserve (SPR) security systems. The general philosophy adopted emphasizes protection of critical components which are difficult to repair or replace and relies upon rapid repair of other elements. A threat spectrum is defined based upon a survey of existing petroleum industry security practices complemented with projected conditions during drawdown. The proposed security requirements are structured to provide a security system capable of deterring, detecting, and responding to a broad spectrum of threats. These security requirements and threat definitions will be used in the next phase of this study to develop individual implementation guidelines for each storage site.

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I. EXECUTIVE SUMMARY

This report addresses the requirements and rationale for security systems at Strategic Petroleum Reserve (SPR) storage sites where the U.S. Government is stockpiling crude oil to minimize the effects of future oil supply interruptions. Development of the SPR security system has progressed through the initial Early Storage Reserve (ESR) site and petroleum industry security surveys, through SPR threat definition and vulnerability/consequence identification, to the final SPR security philosophy formulation and guideline recommendations.

The industry survey indicated that petroleum facilities in the U.S. currently utilize industrial security ranging from low to high levels. The industry views theft by insiders as the most common threat, bombings and minor sabotage as a relatively infrequent threat, and overt attacks as a remote possibility. This is based on past experience as well as economic tradeoffs of security costs vs. the benefits of such security.

Threat levels increase with increasing numbers of persons and enhanced attributes. The low level threat is a single individual acting without extensive forethought and attacking a single point with only readily available assets. The medium level threat is a small group of people who may have significant knowledge, training, and assets and who plan to attack a few key points. The high level threat is several highly trained, motivated, and dedicated individuals with significant assets and knowledge about the site vulnerabilities, and the ability to launch a planned attack on several site components or multiple sites. Commando raids sponsored by foreign countries are included in the high level threat.

General protection criteria are formulated by comparing the impacts of various consequences versus the level of security required to prevent these consequences. Consequences of malevolent acts are listed in their order of seriousness to aid in determining the level of unacceptable consequences. Based upon this examination, physical protection system goals are chosen to provide the appropriate level of protection for each of the SPR operational phases. During acquisition and storage phases, the security system should provide a slightly higher level of protection than exists at similar commercial facilities to deter, detect and delay the expected threats. The goal during these phases is to protect components vital to the drawdown phase from extensive damage. Protection levels are higher for those components which are difficult to acquire or repair than for those which can be easily repaired or replaced. During drawdown the security system should be augmented by additional manpower to provide high level protection against system disruption during this critical phase.

In addition to the perimeter fences, access controls, lighting, and radio communications commonly used in the commercial industry, it is suggested that:

1. Wellheads and manifold areas be fenced and lighted;
2. Pumps be housed in buildings;
3. Electrical substations be protected against remote disablement;
4. The control center be housed in a substantial structure;
5. Two armed, licensed and deputized guards be on duty at all times.

Table 1 provides a summary and relative comparison of the SPR security philosophy for the operational and storage phases versus current petroleum industry security practices.

TABLE 1 - A Relative Comparison of Recommended
 SPR Security Philosophies Versus Survey
 Results of Current Typical Petroleum
 Practices

Protection Elements	Protective Areas	SPR	Commercial				Military
			Remote Storage	Pipelines	Terminals	Refineries	
Fences	M		L	L*	L	M	L
Barriers	M			M	L	M	
Access Control	M				L	M	L
Intrusion Detection	M			L*		L	
Lighting	M				L	M	
Patrols	M		L	L	L	M	L
Communications	M			M	M	M	M

Utilization Codes:

H = High

L = Low

M = Medium

Blank = Negligible Usage

*Note: Used only at pipeline pumping stations

II. INTRODUCTION

1. Background

The Strategic Petroleum Reserve (SPR) program was mandated by Congress in 1975 to provide the United States with petroleum reserves to minimize the effects of future supply interruptions. During an interruption, the SPR is to provide several months supply of crude oil to the private petroleum industry. The amended Energy Act requires an Early Storage Reserve (ESR) of 250 million barrels (MMB) of oil in storage by the end of 1978, and a SPR of 500 MMB of oil in storage by the end of 1980. A second amendment to the Act proposing expansion of the SPR to one billion barrels has been proposed.

To date, the four sites listed in Table 2 have been selected for use in the ESR program. The SPR program will include these plus other selected sites. Most of the crude oil will be stored in caverns which have been leached in salt domes as shown in Figure 1. At least one site, Weeks Island, will use a conventional salt mine for oil storage. The cavern leaching process is initiated by drilling a hole into the salt dome. Fresh water is pumped into the dome to dissolve the salt. As fresh water is injected into the top of the cavern, saturated brine is forced out of the cavern and dumped into a brine pit. Brine is sold whenever possible to commercial sources. Excess brine is either disposed of in the Gulf of Mexico or is injected into deep wells.

Crude oil to fill the storage cavities will be brought to terminals on accessible waterways by tankers or barges. Docks at the terminals can handle ships up to about 80,000 DWT (450,000

Table 2 - Early Storage Reserve Sites

<u>ESR Site</u>	<u>Location (Parish/County & State)</u>	<u>Type of Underground Storage</u>	<u>Estimated Available Capacity (MMB)</u>
Bayou Choctaw	Iberville, Louisiana	Leached Salt Caverns	74
Bryan Mound	Brazoria, Texas	Leached Salt Caverns	63
West Hackberry	Cameron, Louisiana	Leached Salt Caverns	61
Weeks Island	Iberia, Louisiana	Salt Mine	89
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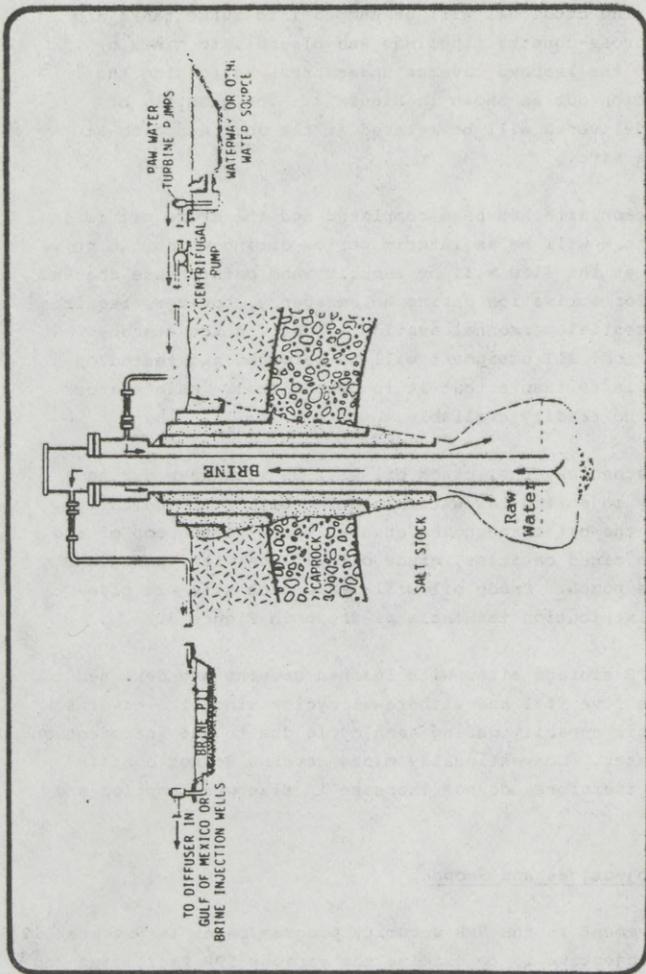


FIGURE 1 Representation of solution mining cycle

barrels). The crude oil will be pumped into surge tanks and then into cross-country pipelines and placed into mines or forced into the leached caverns under pressure forcing the brine solution out as shown in Figure 2. The quantity of crude oil delivered will be metered at the dock and also at the storage site.

When each site has been completed and the crude oil is in storage, there will be an interim period during which the only activities at the site will be security and maintenance checks. Readiness for activation during an emergency, however, requires keeping essential personnel available. During the standby storage period, all equipment will be serviced and tested on a regular basis to insure that it is operational. Maintenance crews will be readily available.

In leached caverns, crude oil will be withdrawn during drawdown by injecting raw water into the bottom of the cavity, displacing the oil through the annular space at the top of the cavity. In mined cavities, crude oil will be withdrawn using submersible pumps. Crude oil will leave each site via pipelines to distribution terminals as shown in Figure 3.

All SPR storage sites with leached caverns are designed to accommodate five fill and withdrawal cycles since the caverns enlarge their capacity during each cycle due to the introduction of fresh water. Conventionally mined caverns do not contain water and, therefore, do not increase in size when emptied and refilled.

2. Objectives and Scope

Involvement in the SPR security program began in November 1977. The major objective is to examine the various SPR facilities and

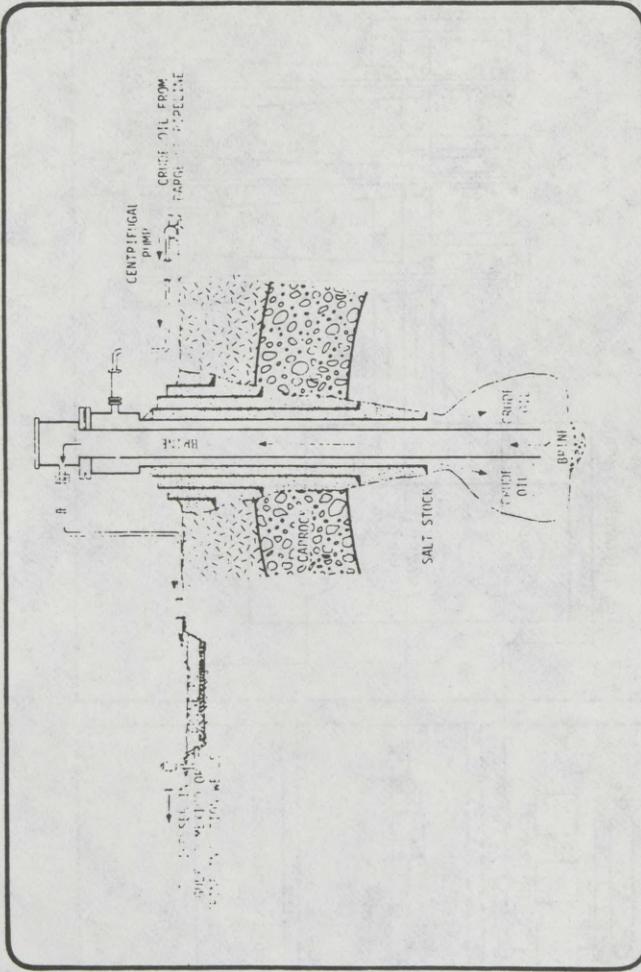


FIGURE 2 Representation of oil storage cycle.

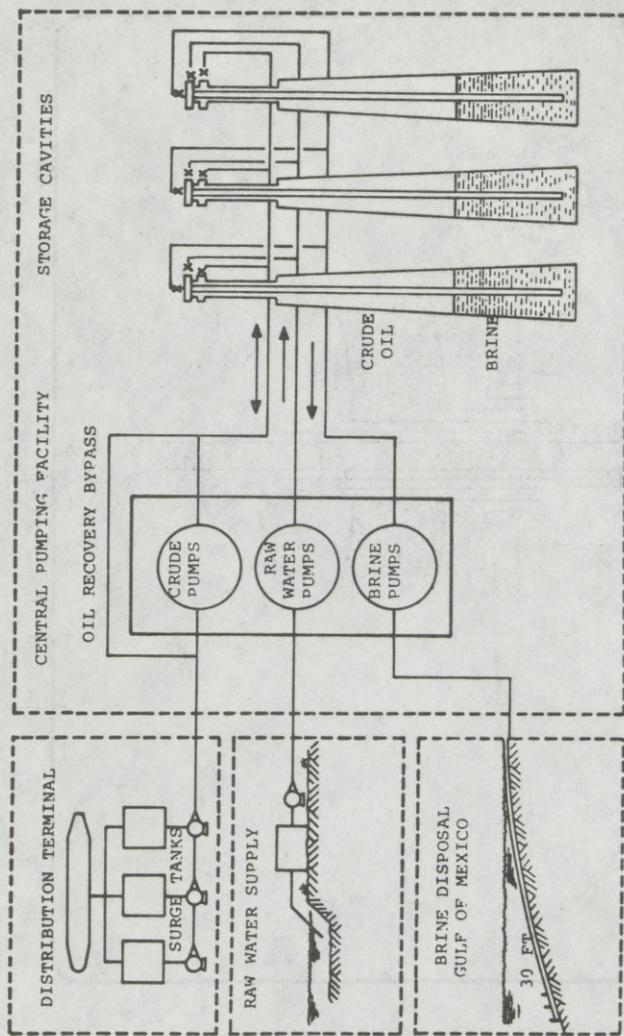


FIGURE 3
SCHEMATIC DIAGRAM OF TYPICAL SYSTEM

recommend a security system for safeguarding the crude oil stockpiles. Since the SPR program encompasses a number of similar storage sites at widely separated locations, a universal security philosophy which will be applicable to all storage sites is formulated in this report. Later, by applying this general philosophy in conjunction with site specific attributes, individual implementation packages will be developed.

III. SURVEY OF SECURITY IN THE PETROLEUM INDUSTRY

A survey of commercial and military facilities was conducted to identify the security technology and philosophy generally used in the petroleum industry. The survey was also utilized as an aid in defining the threat and identifying critical elements in the SPR system. Facilities contacted in the course of the survey are listed in Appendix A and are represented in the following general discussions:

1. Typical Security Featuresa. Refineries

Commercial refineries' security typically includes perimeter fencing (chain link topped with barbed wire) and some lighting. At only one location was the perimeter completely without lights. At one location extensive use was made of secondary fences around such critical items as valves, pumps, and transformers.

Unarmed guards patrol in vehicles and provide access control at pedestrian and vehicle gates. Guards were either company employees, contract employees of a guard service, or a mix of both (in which case company employed guards deal with company employees, and contract service guards deal with contractor personnel). When trouble is anticipated, the number of unarmed guards is temporarily increased, but local law enforcement agencies are expected to provide all necessary forceful response.

In areas where several petroleum companies operate, it is usual to have a mutual aid understanding to help each other cope with emergencies. Several oil companies stressed the importance of gathering and sharing intelligence on possible threats.

Security communications typically are carried out by a two-way radio network consisting of a base station, vehicular radios, and hand-held units. A command and control center typically contains not only the base station for refinery radio frequencies but also a monitor for local law enforcement communications. In some instances, after hours telephone calls are handled at the command and control center. At two sites that have received a number of bomb threats by telephone, equipment is installed to record telephone traffic. In addition, at one of the sites all security communications are recorded to aid evaluation of guard performance in emergencies. Typically, some backup communications capability is provided. At one site two or three systems are installed for each kind of communications link.

The command and control center may be located inside the refinery perimeter in a security and safety building or at the guard gatehouse on the perimeter. In one case the gatehouse had been hardened with relatively substantial concrete construction and bulletproof windows. In two cases an interior security and safety building provided basic living facilities so that it could be manned continuously during an emergency such as a refinery fire or strike. One refinery had a transportable backup communications center that could be positioned wherever needed in an emergency.

Employees are generally identified by a picture badge. At some refineries the picture badge is coded to automatically operate a pedestrian gate. At one refinery a computer is being installed to limit access of any particular person to certain gates during specified hours. Contractor personnel enter a refinery through a separate gate. Visitors are logged in, with approval of the person being visited, at a gate or reception center outside the fenced perimeter. Personal vehicles are parked

outside the fence, usually with separate lots for employees and contractors; the exceptions may be a few management personnel, or personnel working after hours.

Area surveillance with closed circuit television (CCTV) is being used at one refinery. At others, CCTV surveillance is limited to one or two gates if used at all. In one case a helicopter is available on call to supplement ground observations.

Perimeter intrusion detection systems are used at a few refineries. They are recent additions, and are found in areas where incidents have already occurred.

b. Terminals

Terminals are trans-shipment and storage points for crude oil, petroleum products, or both. They are typically fenced except for portions of the perimeter at shorelines. Patrols check these loading and unloading dock areas. Lighting is not used extensively. Very large terminals are guarded; terminals adjacent to refineries generally share the refinery security system. Small terminals are not guarded except under threat of sabotage when contract guards or management personnel man posts at the site. Some companies are introducing automated systems for control of access to the site, to the products, and for product metering and billing. At one terminal, video recording was being installed to provide a record of entering vehicles and drivers.

c. Pipelines

Pipelines are typically not secured. They are regularly inspected from the air for leaks. This practice is usually justified not as a security measure, but traditionally required for loss control and currently justified for environmental protection. One case was found where an isolated pump station on a

recently rebuilt line had been provided with atypical security features. Not only is the pump station fenced with chain link and barbed wire with key control of the perimeter gate, but also two different intrusion detection systems are installed at the perimeter. Alarms are communicated by a combination of telephone lines and a radio repeater system to vehicular patrols along the length of the pipeline. It was stressed that these security measures had been possible because of a cost underrun on the rebuilding of the pipeline and had not been justified for the sake of security. Nevertheless, it seems probable that had security for the pumphouse been thought unnecessary, the funds would have been used elsewhere.

d. Storage Tanks, Isolated

Storage tanks at isolated production fields are typically enclosed with standard industrial fencing but are not usually guarded. A site for salt cavern storage of petroleum products had similar features: barbed wire perimeter fence, chain link wellhead fences, and no guards.

e. Military Facilities

Military petroleum facilities, represented only by a sample of two sites, had a low level of security. A reserve production field is enclosed by a barbed wire fence, has a gatehouse manned by contract guards at night on each access road, and relies on the sheriff's office for nighttime vehicular patrols. A storage terminal has no perimeter fence and exercises no access control although a gatehouse is manned.

2. Threat

To private sector industry, the threat of theft, sabotage, or accidental loss of assets is significant to the extent that it is

a threat to profitability. Countermeasures must be economically justified. Implemented security measures are generally based on past experience of losses due to various established causes. Speculation on possible future changes in types of threat was obtained from a few sources, but extrapolated threat trends were not generally reflected in planned or implemented security systems. The significance of the survey information for SPR security, then, lies mostly in identification of existing threats.

a. Theft

Attractive tools and equipment are almost universally acknowledged to be targets of theft, especially during periods of construction. Many of the countermeasures discussed above seem inappropriate for SPR since the government has no continuing need for a wide range of tools and supplies at each site. At unattended production fields, no surveillance is economically warranted unless a rash of thefts occurs at a particular location. As an experiment, one company is now issuing a "hot sheet" describing stolen equipment, hoping to make its resale difficult.

Theft of petroleum products from truck loading terminals is sufficiently frequent and economically significant to warrant accounting controls throughout the industry. A few terminals have been computerized for unattended operation incorporating access controls.

Theft of products from pipelines is a relatively minor problem and has not justified special measures to detect it. Cited incidents were generally discovered fortuitously with the aid of intelligence. This problem is irrelevant to the SPR pipelines which will carry only crude oil.

Theft of crude oil from pipelines rarely occurs. Special measures to detect it have not been justified. The cited instances were discovered fortuitously. The objective of a thief is to tap a line and bleed it at a rate below the detection threshold of pressure or flow monitoring equipment. Undetected continuous losses on the order of one or two percent of pipeline flow are possible. If a tap were not in continuous use, the loss of oil would, of course, be less.

Theft of on-board crude oil to be used as bunker fuel for a tanker is known to have occurred. One contact commented that this would be attractive only to fuel diesel engines of an old design; modern diesels would be damaged by being run on crude oil.

b. Sabotage

In general, security practices and procedures used to prevent sabotage of petroleum related equipment are minimal. Chain-link fences with padlocked gates are used around vital equipment. Pipeline valves are generally locked with case-hardened chains and padlocks to prevent casual tampering. Guards, almost always unarmed, are used at refineries, some terminals, and rarely as ground patrols among outlying facilities such as pump stations on pipelines. Aerial inspection of cross-country pipelines is routinely used to detect and locate leaks whether caused accidentally or by sabotage. When an installation is particularly susceptible to sabotage (after being threatened, during a strike, or during some other period of civil unrest), guard forces in many instances are reinforced or introduced, as a temporary measure. For more severe threats or after an actual sabotage, local law enforcement agencies and possibly the FBI are called upon for assistance.

With a few emphatic exceptions, the feeling within the petroleum industry is that the likelihood of significant successful sabotage is very small, the consequences resulting from a temporary disruption of operations are acceptable, and deployment of vigorous security systems to detect, assess, delay, and intercept the adversaries is not cost effective. Most contacts report that they have "no problems" or have "never had any trouble." However, these claims in some cases do not preclude having received a bomb threat or even having found a dud bomb at a refinery. At the least, these statements appear to mean that the existing security system satisfies the present needs.

California, the San Francisco Bay area in particular, is a region where sabotage of refineries, tank farms, and pipelines occurs and is taken seriously by the industry. Bomb threats occur regularly; any one facility may receive up to a half dozen in a year. Facilities in or near major metropolitan areas are generally better secured than more isolated facilities. The threat to facilities is perceived, by industry, to be lowest in the mid-continent and Gulf coast regions.

Storage tanks and refinery systems are generally conceded to be vulnerable if attacked. Damage in the U.S. to date has been minimal due to the lack of technical expertise employed in attempted bombings. The bombings at Trieste, Italy, did cause significant damage, however.

Isolated facilities are not practical to protect when off-site forces cannot respond to alarms quickly enough to prevent sabotage and when the rate of economic loss does not offset the cost of an on-site force.

3. Critical Elements

Industry contacts were aware of the SPRs' intended function but generally had little familiarity with the SPR design concept.

Comments concerning vulnerabilities of critical elements common to both industrial and SPR facilities were obtained and are summarized in the following paragraphs:

Several contacts felt that, in general, there would be no threat to SPR other than natural forces such as lightning. One contact expressed the opinion that commercial facilities probably would be more attractive targets than SPR because of the government ownership of SPR and because SPR would probably be better protected than commercial facilities.

The electric lines, substations, and switches, critical to the operation of SPR equipment, are recognized by industry contacts to be vulnerable to sabotage. However, the responsibility for providing power and maintaining essential substation equipment ultimately lies with the electric utility. Substations located within the perimeter of a petroleum facility benefits from whatever perimeter security exists.

Pumps perform critical functions, and often finding a suitable permanent replacement involves a substantial delay. Industry generally feels that a lost pump can be partially replaced quickly, with a temporary substitute or by using redundant equipment already installed. Consequently, pumps were not considered to be critical elements within the industry.

The industry generally conceded that pipelines cannot be protected. Some contacts felt that burial of a line is helpful. Repair of damage to crude oil lines can be normally completed in a day or two; however, unusual circumstances can greatly delay repairs.

IV. SITE SURVEYS

In order to develop and evaluate an effective security philosophy for the SPR storage sites, it is important to first understand the environment within which the security system will operate. The following sections describe the ESR sites and provide background information for the security rationale discussed in Section VII.

1. Bryan Mound

The Bryan Mound storage site, illustrated in Figure 4, is located approximately three miles from Freeport, Texas. The 500 acre site is located in a marsh area, and parts of the site are covered by shallow waters. Surrounding lands are sparsely populated and are primarily used for cattle grazing. Small animals such as rats, rabbits, raccoons, and skunks abound in the area. Three public roads provide access to the site. County maintained roads pass through the site. Most roads are elevated on levees.

Crude oil is currently transported to the site from the Seaway terminal via a 30 inch line which is buried six to eight feet. The oil passes directly from the terminals into the caverns. After the next construction phase, the oil can go either to the caverns or to the four 200 MB surge tanks. There will ultimately be eight to ten caverns at the site with multiple wellheads per cavern. All intra-site oil lines will be buried. Fresh water will be obtained from the Brazos River Diversion Channel adjacent to the SPR boundaries. The saturated brine solution will eventually be pumped to the Gulf of Mexico but is now being sold. Power for the site is provided by Houston Power and Light to the government owned substation which will handle 600 KVA. An emergency

generator will be capable of providing sufficient power for selected lighting, monitoring functions and shutdown procedures. The site is fairly compact, and the substation, control center, and separate pump buildings are all centrally located.

2. West Hackberry

The West Hackberry site, located in Cameron Parish, Louisiana, is illustrated in Figure 5. Although the 380 acre site is located in a marshy area, it does not have extensive areas covered by standing water. The northern boundary of the site, however, extends into the shallow Black Lake. Lands surrounding the site are sparsely populated and are used primarily for farming, by other petroleum facilities, and for recreational use. Access to the site is by a single secondary county road. There are no public roads within the ESR site boundaries, but a livestock right-of-way may have to be allowed. The indigenous wildlife includes alligators, snakes, marsh deer, rabbits, and many varieties of waterfowl.

Oil being pumped into the five existing caverns is currently being brought in by barges to Amoco docks, approximately one and a half miles from the site. Ultimately, oil will be brought in from Nederland Terminal facilities via a 42 inch buried pipeline. Plans for the site include filling all five existing caverns, then leaching 15 additional caverns to complete the complex. Construction plans call for a 36 inch brine line to the Gulf and a 12 inch fresh water line from Black Lake. All on-site piping will be buried. The current brine disposal wells are located one mile from the storage site. Power for the site is supplied by Gulf State Utilities who will own and maintain the site substation.

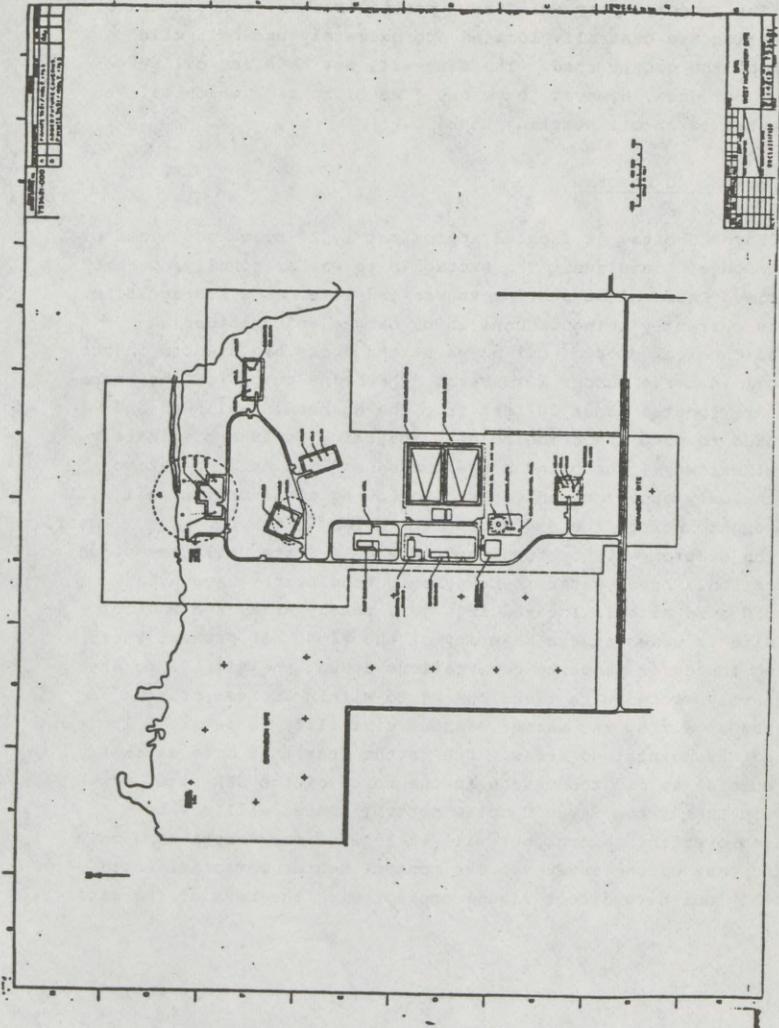


Figure 5 - West Hackberry Site

The proposed pump buildings, control center, and electrical substation are centrally located approximately one-half mile north of the county road. The site will not have any oil surge tanks, but does, however, have one 7 MB brine tank which will be converted to an oil settling tank.

3. Bayou Choctaw

Bayou Choctaw is located approximately 20 miles southwest of Baton Rouge, Louisiana. The storage site was originally operated by Allied Chemical as a brine source and later as a storage site. Oil is currently being brought in by barges and unloaded at Allied Chemical docks. Oil pumps at the docks are used to inject the oil into the Number 15 cavern. The brine pumps for the operation are located about 20 feet from the Number 15 wellhead and are used to pump the brine to deep injection wells approximately two miles away. The brine surge tanks used for this operation are the only above ground tanks. Following construction, oil will be brought in from the St. James Terminal by a new pipeline. Power for the station will be furnished by a Gulf State Utilities owned substation. Fresh water is brought in from nearby Cavern Lake. The 350 acre site is located in a very swampy area, and most of the site is underwater a majority of the time. At present there are no fences or property demarcations around the site. The area is heavily wooded with trees coming to within 20 feet of some wellheads; during the warmer seasons visibility is severely limited beyond any maintained areas. Due to the fear that more caverns may subside as did the cavern to the north of the SPR site, now "Cavern Lake", the Bayou Choctaw control center will not be located over the caverns but will be located one fourth of a mile to the east of the caverns. The control center personnel would probably not have direct visual contact with the rest of the site.

Bayou Choctaw has several access routes. Allied Chemical still has operational facilities colocated with the SPR site, and most access roads move back and forth across the boundary between the two properties. Hunters use the local roads for access to leased hunting grounds which are abundant with squirrels, rabbits and deer. Two man-made canals cross the SPR site.

4. Weeks Island

The Weeks Island storage site is located directly on the coast about 50 miles south of Lafayette, Louisiana. The salt dome has elevated the site to approximately 100 feet at the crest of the hill making it quite noticeable above the typical surrounding swamp lands. The salt at this site has been conventionally mined by Morton Salt, and the oil will be stored at atmospheric pressure in the mined areas.

When filling begins, crude oil will come from the St. James Terminal via a 67 mile long 36 inch buried pipeline. Oil will be stored in the currently operational part of the mine which has a production shaft and an emergency shaft. ESR plans call for oil filling to begin through the production shaft with subsequent fillings through the emergency shaft. Oil removal will be accomplished via fourteen submersible pumps through the emergency shaft pipeline. The site will not have any above ground tanks. The electrical substation, control center, and fill pumps will be colocated approximately 350 yards from the emergency shaft within the main SPR boundaries; the emergency and production shaft perimeters are not contiguous with the remainder of the site.

The Weeks Island site shares boundaries and access routes with a commercial company, Morton Salt. The emergency shaft is contiguous

with Morton Salt's processing building which will not be vacated when the mine shaft is closed down. The area surrounding the pumps and control center is hilly and wooded. The production shaft area has been cleared and leveled. Access to the site is provided by two privately maintained roads, one of which was constructed exclusively for the SPR site.

5. St. James Terminal

St. James Terminal is a commercial petroleum facility located on the Mississippi River approximately 40 miles southeast of Baton Rouge. The terminal currently consists of four loading/unloading docks, a tank farm, and, presumably, the associated pipelines and control station. The Capline, a major commercial pipeline, starts directly across the river from the terminal. The SPR program calls for construction of two additional government owned docks at the terminal and buried pipelines to the Bayou Choctaw and Weeks Island sites. The 36 inch diameter pipelines include several valves between the storage sites and the terminal.

The public makes regular use of the levee adjacent to the docks and Highway LA 18 which crosses between the docks and the current tank farm. The area surrounding the terminal is moderately populated by rural communities.

V. THREAT TO STRATEGIC PETROLEUM RESERVE

1. Introduction

This section considers potential malevolent activities which could affect the SPR capability to achieve its design goals. The motivation for such activities and the attributes of those who might attempt such are discussed.

The petroleum industry in the U.S. currently utilizes industrial security ranging from low to high levels as summarized in Section III. The industry views theft by insiders as the greatest threat, bombings and minor sabotage as credible and overt attacks as a remote possibility. This is based on past experience as well as economic tradeoffs of security costs vs. the benefits of such security. The legal and safety problems associated with firearm usage have motivated most facilities to rely on local police to handle any forceful activities.

2. SPR Threat Considerations

The above discussion could lead to the conclusion that the SPR threat should be similar to that currently considered credible by the petroleum industry. This may be true but consideration should be given to some additional factors in defining the SPR threat. There are arguments both for and against providing protection which exceeds that in the private sector.

The criticality of the drawdown function and the current surge of terrorism are major reasons for providing significant protection for the SPR system. The SPR system represents a very large source of petroleum in the drawdown conditions postulated.

There are several "choke points" in the government-owned system which could be damaged to effectively prevent the use of large portions of the SPR stored crude oil. Because of the expected heavy reliance on the SPR during drawdown, it will have a high publicity profile. The SPR program has already gained considerable publicity among the news media of the United States and the world. The high visibility of the SPR storage program coupled with the awareness of the great impact that an oil shortage can have on the national economy make the SPR an attractive target for terrorist activity. SPR could thus be used effectively by a group desiring public exposure for their cause. Such publicity is often the sole object of malevolent activities. There has been an upward trend in terrorist activities in recent years which has caused several European countries to develop protection and counter-measures against terrorism. The U.S. has not experienced as much activity, but some hold the opinion that this will increase as other countries improve their ability to cope with terrorism; thus driving the terrorists to softer targets in the U.S. Brian Jenkins of RAND has stated that there are several U. S. groups in existence that have demonstrated the capability to severely damage the SPR facilities.

Arguments against providing more protection than that given private facilities include the critical role that commercial facilities will play in delivering the SPR crude oil to its final users and the decentralized locations of the SPR facilities. Even if the SPR facilities are heavily protected, significant interruptions of the SPR oil supply could be achieved by damaging commercial docks, pipelines, refineries, etc. In other words, prevention of SPR damage does not insure the availability of the end products. It should also be recognized that damage at any one of the SPR facilities does not preclude the use of the

remaining capabilities of the SPR system. This provides the SPR with the capability to meet the requirements of the less severe embargo scenarios even if one of the facilities is severely damaged.

3. Threat Description

The threats which can reasonably be expected at the SPR sites are divided into low, medium, and high levels. Although it is difficult to quantify the number of attackers in each threat level, experience gained from vulnerability analyses of nuclear facilities indicates that the adversary's attributes are as important as the actual numbers. The types of damage that each threat category can accomplish are similar; but, as the group becomes larger, the attackers' assets tend to become more sophisticated, more targets can be hit, and more extensive damage can be done. The attributes assigned to each threat category are listed in Table 3.

The low level threat involves a single person whose familiarity with the system ranges from none to significant knowledge about a few vital system components or even the entire facility. Since the individual could be very knowledgeable about some parts of the system, a great amount of damage could be done in a relatively short time. For example, an individual familiar with the computer control system may be able to manipulate the controls to cause significant failures in the system; someone familiar with the electrical power supply can destroy critical power transformers; power from the transformers to the pumps is normally three-phase but could be changed to single-phase resulting in destruction of the pump motors. Even an individual who does not have a high degree of knowledge

TABLE 3
Threat Definition

ATTRIBUTE	LOW	MEDIUM	HIGH
Number of People	1	1-3 (could include insiders)	1-10 (could include insiders)
Background	Employee, former employee, others	No special training	Military training
Armament	None	All legally obtained weapons (handguns, rifles, shotguns)	All legally obtained weapons plus automatic weapons, bombs, grenades, anti-tank guns
Explosives	Home-made bomb	Home-made bomb, dynamite	High explosives
Equipment	Tools readily available	All transportable hand, power, and thermal tools	Same as medium threat plus radio frequency jamming devices
Transportation	Foot	All convenient 2 & 4 wheel drive vehicles, boats, underwater diving apparatus	Same as medium threat plus swamp buggies, air-boats, air cushion craft, helicopters
Knowledge	High for insider to low for outsider	High for insider to low for outsider	High - complete knowledge of facility layout, guard locations and patrol schedules, detector types and locations. An insider is assumed to be cooperating and providing information.
Number of Points Attacked	1	1 to a few	1 to several

These threat levels are based on current petroleum industry estimates for the low level and on potential terrorist attributes for the high level, based upon historical information.

of the system components could produce severe consequences by damaging components which are deduced to be critical. Casual tampering with the system could cause similar destruction. Even though the results could be relatively significant, this threat is designated as low level because the attacker will not generally plan extensively in advance and will have limited resources.

The medium level threat consists of a few individuals (1 to a few) who may or may not have extensive knowledge about SPR system vulnerabilities. Observation of the site during the adversaries' planning stage, or use of an insider, should have defined a number of components that the group feels are vital and which, if destroyed, would cause serious damage to the system. This threat level is assigned a fairly high degree of sophistication because the group has time to obtain needed equipment and information and is dedicated to its cause.

The high level threat is assumed to be a highly dedicated and motivated group (1 to 10 individuals). External backing, in the form of finances and equipment, may be provided by a source which could benefit by disabling a portion of the SPR. The group is capable of extensive planning and coordinating and is assumed to have complete knowledge of the site layouts. The points to be damaged are predetermined to result in the maximum damage to the SPR and may not be confined to a single site. The equipment that this group can obtain to use in their assault may be almost limitless. This threat level includes commando raids sponsored by foreign countries to maximize the impact of an embargo.

VI. STRATEGIC PETROLEUM RESERVE PROTECTION CRITERIA

The level of protection provided at the SPR sites must be chosen to prevent unacceptable consequences. Consequences can range from unacceptable for permanent loss of the oil to acceptable for minor inconveniences. Ideally, all adverse consequences should be precluded, but the effects of each consequence must be weighed against the cost and operational impacts associated with preventing the consequence. The level of acceptable consequences for each of the acquisition, storage, and drawdown phases must ultimately be agreed upon by the SPR Office. Following is a brief discussion of several malevolent acts and the associated consequences in descending order of seriousness.

1. Destroy the wellhead. If a wellhead is destroyed and down-hole safety valves are not used, the crude oil will spew out of the cavern, probably resulting in a fire, and create a large cleanup problem. People with knowledge of cavern storage have stated that from one to five percent of the cavern contents could be ejected.
2. Destroy pumps. Many of the pumps and motors are large and uncommon and could require a long period of time to repair or replace. Suitable replacements could be borrowed if they can be located and are not otherwise available. To obtain a replacement from a normal vendor usually requires several months.
3. Interrupt electrical supply to site. The wiring in the system is considered not to be critical, but many

of the transformers and switches are not readily available and could require time to find, obtain, and install. Makeshift replacements could be utilized if needed immediately. Emergency on-site power generators are not practical due to the large quantity of power that is required.

4. Destroy critical elements at terminals. Damage to the docks, loading/unloading mechanisms, surge tanks and manifold systems at terminals could require days or weeks to repair.
5. Destroy computer control system. The piping system is complex and requires precise control to function safely and efficiently. Computer terminals are becoming very popular to control the systems and, hence, become a vital link in the system operation. Most oil handling systems can be operated manually if the computer system is disabled. There should be no reason that the SPR could not also improvise and be returned to service.
6. Destroy control valves. Destruction of a valve should cause only a minor oil loss and a small fire since other controls on the system should stop the oil flow. If the valve is specialized, like the large motor operated valves on the main pipeline, the down time for repairs could be lengthy. Control valves on the site are generally smaller, but they are not well protected and can be easily destroyed. Replacement may be relatively simple, a few hours or days, if a suitable replacement is available.

7. Puncture piping. There will be a small loss from the line and probably a fire. Individuals contacted in the petroleum industry feel that most pipeline failures can be repaired within a day if the section is readily accessible. There are places along a pipeline where repairs could take much longer depending on the location and weather.
8. Damage fresh water supply. The fresh water input is necessary for drawdown. Such damage could be rectified in a day or less at most sites since the sources of fresh water are relatively close to the caverns. The environmental filter may be inoperative in the short-term solutions.
9. Disturb the waterway channels. This could effectively prevent loading barges and tankers from the SPR supply. The duration of such a disruption would be a function of the damage done to the channel.
10. Disrupt communications. Acts to prevent radio or telephone communication within the SPR system could likely accompany any of the above. Disruption of communications would not itself be a severe problem but could certainly enhance the effect of some of the above acts.
11. Damage brine disposal system. An environmentally acceptable disposal location is necessary during fill. Piping damage would fall under 7 above. Damage to the brine wells is possible by wellhead destruction or by introducing contaminants into the brine to plug the sand strata. Damaged wellheads could be repaired in

a day or so, but clever contamination of a well could take much longer to rectify.

The consequences associated with the malevolent acts described above are listed in Table 4. The wide ranges of downtimes associated with the potential acts result from the uncertainty in the availability of replacement parts and equipment. Redundancy built into the system for operational reasons will help reduce downtime in cases where destruction is not massive. Downtimes do not necessarily relate to the total SPR system but rather to the sites, wells, etc., associated with the act. The significance of downtime depends on the operational phase and the conditions of the embargo. Theft of crude oil is not included in the table since the consequences thereof appear to have insignificant impact on the drawdown capability. Very large covert thefts would be required to have a significant impact.

The SPR capability to achieve its objective after successful malevolent activity is a function of the operational phase. In the acquisition and storage phases, successful malevolent activity could result in unanticipated expenditures for repairs and crude oil replacement. If an embargo occurred before repairs were complete, the drawdown capability of the SPR could be seriously impaired. Therefore, it is essential that the SPR security system be capable of providing appropriate protection for each of the operational phases.

TABLE 4
Consequences of Malevolent Acts

<u>Action</u>	<u>Downtime</u>	<u>Other</u>
Breach Wellhead	Days to Weeks	Lose 100's to 1,000's bbl's, Fire may damage other facilities
Damage Pumps	None to Months	
Damage Electrical Substation	None to Months	
Damage Docks	None to Months	
Breach Surge Tanks	None to Months	
Destroy Computer Control System	None to Months	Oil Loss, Potentially Large Fire could damage other facilities
Damage Manifold System	Days to Weeks	Small Oil Loss, Fire
Breach Oil Pipeline or Valves	1 - 2 days	Small Oil Loss, Fire
Breach Fresh Water Pipeline	Less than 1 day	
Disturb Channel	None to days	
Disrupt Communications	None as a single act	
Breach Brine Pipeline	1 day	

Notes:

1. Downtimes are a function of extra parts and available equipment.
2. Downtimes relate only to a single cavern, single site or complex feeding a pipeline.
3. The significance of downtimes is a function of the embargo scenarios.
4. Consequences of theft appear to be insignificant with respect to drawdown capability.

During acquisition and storage it is desirable to provide deterrence and detection capabilities against a threat intent upon damaging any of the vital systems on site. Security will be enhanced during the acquisition phase by the high level of activity at the sites, but during storage there will be little activity except for normal maintenance. The minimum goal during these two periods is to protect the vital components necessary for drawdown at the storage sites and government owned terminals. The level of protection required can be tempered by considering that:

1. Embargos will probably occur infrequently.
2. Shipments in transit and regional reserves can provide the needed oil supply for approximately a month.
3. The U. S. may have advance intelligence about an upcoming embargo.

During drawdown a serious threat such as the high level threat in Table 3 could quickly develop in an attempt to deprive refineries of feedstock from the SPR. Activity at the sites will again increase and enhance security somewhat but will do little to bolster the response force. The goal during this phase is to prevent significant oil flow interruptions. The increased level of protection for all essential SPR elements should be based on the severity of the embargo, available threat intelligence and other relevant factors.

To accomplish the above goals during all three operational phases, the security philosophy adopted is to install, during normal construction, the hardware necessary to detect and delay the expected threats. The hardware will be kept online during the acquisition and storage phases to support the lower levels

of protection. Protection against the higher level threats during drawdown will be augmented by adding the necessary manpower from either government or private organizations. This approach will tend to minimize security operational costs during acquisition and storage while still providing the protection capability desired during the drawdown phase. Thus, the protection goal suggested during acquisition and storage is to prevent the consequences discussed previously in items 1 through 5 (wellheads, pumps, electrical supply, government terminals and control centers). During drawdown a higher level of protection should be provided to prevent all consequences.

The above physical protection criteria are specifically directed at SPR facilities. The flow of crude oil from the government pipelines to the refineries is through pipelines, barges, or tankers belonging to private industry, and these, too, may require additional security measures. However, security at the SPR is limited to safely delivering the crude oil to the end of its pipeline. From then on the security must be handled by others unless government protection is justified by the threat assessment or embargo scenario.

VII. SECURITY REQUIREMENTS AND RATIONALE

1. Security Requirements Overview

The basic security philosophy discussed in this section outlines minimum physical security requirements for all critical system components needed for SPR drawdown. The intent is to emphasize protection of critical components which are difficult to repair or replace and to rely upon rapid repair of other elements when damaged. Options to increase the basic level of protection are discussed but are left as alternatives to be considered in conjunction with the site implementation packages.

Security requirements, except for communications and security forces, are summarized in Table 5. The suggested minimum protection elements are indicated by the "S" entered in the table, and any additional methods which might also be employed are checked (✓). Entries under the column headed "Barriers" will be explained as each system component is discussed, but in general would imply higher levels of protection such as revetment walls, containment buildings, or burial of the item. The "Operational Security Data" column refers to the normal monitoring of pressures, flow rates, valve positions, temperatures, and vibrations. All of these measurements should come from standard operational data which can, in turn, be interpreted to indicate any security problems. This security approach relies upon the control center operations personnel to notify the security force of any operational data indicating a security incident.

2. System Componentsa. Perimeter

The intent of explicit perimeter definition is to deter

TABLE 5. Summary Security Matrix for SPR - Listing identified critical components/areas with recommended security elements (S) and optional elements dependent upon site specific characteristics (✓).

System Components	Protection Elements	Fences	Barriers	Access Control	Intrusion Detectors	Lighting	Patrols	Communications	Operational Security Data
Perimeter	S		S		S ¹	S	S ¹		
Wellheads	S	✓	S	✓	S	S			S
Pumps		S	S	✓	S	S			S
Manifolds	S		S	✓	S	S			S
Pipeline		S				S			S
Oil Tanks	✓			✓	S	S			S
Control Center		S	S	✓	S	S	S		
Fresh Water System		S				S			S
Brine Disposal System		S				S			S
Electrical Sub-Station	S	S	S	✓	S	S			S

¹Note: These elements are applicable only at the main entrance gate

access by unauthorized personnel. Where appropriate, the perimeter of each site should be identified by a substantial fence located to insure the integrity of the secure area. Chain link fence with barbwire outriggers is preferred since it provides positive control for casual intruders and most large animals. The perimeter should be well marked with signs prohibiting trespassing or the introduction of contraband materials. Gates should be constructed to be commensurate with the fence strength and should either be locked or manned by a security officer. All entrances should be posted to authorize searches of all entering or exiting vehicles and personnel. At those sites where perimeter integrity would be compromised by current non-SPR access, it is recommended that alternate routes be located or constructed. If this is not possible, the original area should be subdivided into separate defined entities.

Sufficient intra-site roadways should be provided to allow roving patrols to visually check perimeter boundaries and critical areas, and to respond rapidly to any alarms. Perimeter lighting is recommended only at major access points. During a drawdown situation, where a more serious threat has been identified, portable lighting is recommended.

Intrusion detection systems are not recommended for use on all site boundaries. Implementation packages for each facility may, however, indicate unusual site specific circumstances that dictate the use of a detection system and will, if applicable, outline the requirements of the system.

b. Caverns, Wellheads and Mines

The underground storage of crude oil is in itself an inherently secure approach to the safeguarding of the petroleum

reserve. Under these circumstances, the security philosophy adopted is one of assuring the oil's availability and of safeguarding the equipment and materials needed for eventual oil removal. Scenarios involving theft of crude oil from the caverns/mines can be hypothesized but are not considered to be consistent with the low level threat defined for the storage phase of the SPR program. Aerial photos and periodic evaluation of the surrounding areas are expected to be adequate to detect slant drilling efforts to tap the caverns.

Wellhead trees are vital to the operation of the sites and, if destroyed, could result in extended downtimes and loss of some oil. As a minimum, each wellhead pad should have a perimeter fence with entrance gates constructed to allow access by authorized personnel. The enclosed area should be sufficiently lighted to allow roving patrols to visually verify the integrity of the wellhead equipment. In addition, to prevent remote disablement of the wellhead trees, an open roofed structure or revetment surrounding each tree may be appropriate for enhanced security. Similarly, electronic intrusion detection devices may be effectively utilized around wellhead areas where security patrols cannot insure timely detection of intruders.

Operational changes which would improve security have been identified and are outlined here. Inclusion of a reliable down-hole safety valve at each wellhead would be highly desirable from a safety viewpoint and would also minimize the consequences of a sabotage attempt. Crude oil could be chemically contaminated while either in transit or in storage. If the possibility of such an attempt and its associated consequences are considered to be unacceptable, periodic chemical and physical analysis of the oil may be justified.

Protection of crude oil and system components in mine storage cavities should be similar to wellhead protection. Fences and barriers around the mine opening to control access, and lights positioned to illuminate mine entrances are recommended for minimal security. Electronic intrusion detection devices may be desirable and will be examined in the site implementation packages.

c. Pumps and Manifolds

Although physical protection of pumps and manifolds can be accomplished similarly, it is unlikely that the pumps and manifolds will always be colocated; accordingly, separate protection philosophies are defined. As a minimum, the manifold equipment should be fenced and lighted. Positions of valves in the manifold area should be monitored periodically by operational personnel to insure that opened or closed valves remain in their proper position.

Oil injection pumps and their associated above ground connections should be located within a substantial containment building with access control. Both interior and exterior lighting of the building should be provided. Operational data should be monitored to provide information concerning pressure and flow of crude oil, and motor temperature and vibration to aid in detecting security problems. Electronic intrusion detection devices may be recommended in site implementation packages depending upon specific pump building construction and door lock types.

Since the pumps are long lead time items, it is desirable to maintain replacement units either at each site or at a central location where spares for all the SPR system are stored. As a

minimum, each site should develop contingency plans specifying where and how replacement pumps could be expeditiously obtained.

d. Above Ground Tanks

Above ground tanks are normally included in a system to handle surges which occur due to different pumping rates. Under emergency conditions and at reduced rates, however, the system can operate with any available surge tank, so temporary loss of a tank should not prevent drawdown. The minimum amount of security recommended for above ground tanks is illumination of all tanks and installation of fences. At sites where the perimeter access control system is found to be sufficient, the fence around the tanks may be omitted. Electronic intrusion detection devices may be beneficial at some locations to aid the periodic security patrols but generally are not essential. Information obtained from the normal operational monitors should be adequate to verify the proper functioning of the tanks or to indicate that a problem has occurred.

e. Control Center

The control center houses the electronic equipment normally utilized to control the flow of crude oil. Although the system can be manually operated, vital system measurements must be monitored and communicated to others in order to sustain efficient drawdown operations. Where intrusion detection systems are used, the alarms should be monitored from the control center. In addition, communication links to the security force, to on-site personnel controlling pumps and valves, to terminal operators and to the SPR security office must be maintained. The structure housing the control center should, thus, be hardened in comparison to normal construction practices to reduce the probability of unauthorized entry; doorways, windows, and other openings should

be secured. The communications center should be housed in the control center and manned at all times. A rooftop observation post may be desirable at some sites to provide an elevated vantage point. Illumination of the exterior of the building is recommended. Electronic intrusion detection devices may be desirable at some sites because of local conditions, but the protection recommended in the above paragraph, along with periodic observation by the roving patrols, should be adequate at most of the locations.

Since the control center will be manned at all times by operational personnel, individuals who have authorized access should be able to enter and leave the control center without the aid of the security force. Traffic at the control center will not generally be high enough to require the use of an automated access control system, and a manual system activated by the individuals may be sufficient.

f. Crude Oil Pipeline

Pipelines are, in general, very difficult to protect with anything less than a very costly people-intensive approach. The consequences of a pipeline rupture are, however, considered to be fairly minor since ruptured piping is generally quickly repaired, and valves can be rapidly replaced or bypassed if repair items are maintained at or near the sites. It is recognized that there are inaccessible locations along the pipeline where repair of a failure could take considerably longer, but increased protection against the possible consequences is not justifiable. Security patrols and normal operational monitors should be adequate to detect any failures which may occur and should allow the system to be safely shut down without major losses. Operational data regarding pressure levels in the

system will provide a secondary, but indirect, method for monitoring valve positions and pipeline failures.

A high level of security is not recommended for the pipeline. Burial, whenever practical, is recommended to make access to the pipeline more difficult.

g. Fresh Water System

The fresh water system is essential for drawdown but should not require any more protection than the crude oil pipeline. The pipeline should be buried wherever practical, and the pressure should be monitored. Supplies should be maintained at the site to make repairs rapidly. The pipeline route should be patrolled periodically to look for leaks or evidence of tampering.

An elaborate filter on the inlet of the fresh water system is necessary for environmental reasons, but drawdown of the caverns does not require filtered water. Sediment and trash could be injected into the caverns in an emergency without affecting long-term performance.

h. Brine Disposal System

The brine disposal system is not needed during drawdown and, therefore, requires a minimum of physical protection. Burial of the pipeline is considered desirable whenever it is practical; monitoring of pressure at the brine pumps is desirable but should be part of the operational data normally monitored. Supplies should be maintained to repair the pipeline if a rupture should occur. The pipeline should be patrolled periodically to check for leaks, mainly for environmental protection, and to look for evidence of tampering.

3. Electrical Substation

Power to operate the SPR equipment is obtained from commercial electric utilities, and if the commercial source is interrupted or disabled, crude oil cannot be moved. Therefore, physical protection of critical components in the electrical system is a vital part of the security philosophy.

As a minimum, the power transformers should be fenced and illuminated. Fence gates should be constructed to allow access to authorized personnel while acting as a deterrent to others. Shielding around the transformers to prevent remote disablement by rifle fire is desirable and will be considered in site implementation packages. Electronic intrusion detection devices may be desirable at some locations and will be considered in conjunction with site specific attributes in the implementation package development. The electrical substation should be checked frequently by the roving patrol.

Maintaining replacement transformers at every site is desirable but is not considered to be cost effective. As a minimum, however, each site should develop contingency plans specifying where and how suitable replacements could be obtained to continue operations (possibly at a reduced flow rate). In addition, if the transformers at the various sites are sufficiently similar, it is recommended that consideration be given to storing one or two types of transformers at a central location for use as spares.

Emergency power generating equipment, sufficient to replace interrupted commercial power, is not considered economically feasible. There should be, however, adequate emergency power supplies available to continue operating vital operational

shutdown equipment and communication systems. Delivery of crude oil can be continued when commercial power is restored.

4. Communications

The communications network should be controlled from a communications center housed in the control center. Additionally, a secondary backup communications center should be located at a separate security headquarters normally located at the main access control gate.

The radio equipment should consist of base, mobile, and handheld radios. Each member of the security force should be equipped with a radio. At least two radio frequencies should be available for use. Operational personnel will normally use one frequency and security the other. Radio communication with city, county, and state police should be established and exercised periodically to insure performance. Telephone communication connecting on-site and off-site locations should be provided for day-to-day usage and for emergency backup to the radio system. The radio base station and telephone communication capabilities should provide independent means of communicating from each site to the SPR security office.

5. Security Force

The security force at each site will be obtained from a competent contract guard service and will be under the direction of the SPR security office. Overall SPR security operations will be coordinated from this office. The general security force guidelines contained in the DOE Interim Management Directive No. 6105, "Physical Protection of DOE Property,"

are generally applicable to the SPR facilities. These guidelines are directed at protection of DOE property against damage; but because of the strategic nature of SPR facilities, the following sections include additional specific recommendations in utilizing the security force at SPR sites.

a. On-Site Personnel

A minimum of two security personnel should be on duty at all times. Side arms are recommended, and security personnel should be licensed and, whenever possible, deputized.

The security force will be responsible for controlling access to the site and to protected areas within the site and for patrolling the site and, as practical, nearby sections of pipeline. One guard will man the security headquarters at the main entrance and control ingress and egress from the site. This guard will also monitor radio frequencies and conduct any searches of personnel or vehicles deemed necessary. Annunciators for intrusion detectors, if used, will be housed at the control center and alarms communicated to the security headquarters. The additional guard(s) will randomly patrol the site at intervals not to exceed two hours, respond to alarms, and patrol the off-site pipelines. Occasional security patrols of the pipeline should be used in addition to maintenance and operational patrols of the pipeline. Throughout all patrols, security personnel should communicate with the control center and security headquarters at predetermined intervals.

To aid the security force in identifying authorized individuals, an employee ID badge system is recommended. Badges should be coded to display authorization for access to any interior controlled areas such as the control center, electrical substation, etc.

Security personnel will also perform the following functions: apprehend persons or vehicles gaining unauthorized access; check areas of security interest during non-working hours to determine that they are properly secured and otherwise in order; report unusual circumstances; perform essential escort duties; implement and enforce the established system of control over the removal of material from the site; respond to protective alarm signals (if any are used) or other indications of suspicious activity; and act as necessary in the event of situations affecting the security of the facility including industrial accidents, internal disorders, and attempts to commit espionage, sabotage, or other criminal acts. Security personnel should not become integrally involved in fire fighting activities but should continue their functions to maintain site security.

b. Supplemental Security Force

As the need arises, the on-site security force will obtain backup assistance from non-SPR agencies. Agreements and procedures should be established with the local law enforcement agencies for their assistance when it is needed. During extreme circumstances, the services of the state and national armed forces should be called upon; arrangements should be made and confirmed annually.

APPENDIX A
PETROLEUM FACILITIES SURVEYED

The following companies make up the majority of the companies visited or contacted in the survey of petroleum company security measures:

Alyeska Pipeline Service Co.
P.O. Box 4-2
Anchorage, Alaska 99509

American Society for Industrial Security
2000 K Street, N.W.
Washington, D.C. 20006

Amoco International Oil Co.
200 E. Randolph
Chicago, Illinois 60601

Atlantic Richfield Co.
515 South Flower Street
Los Angeles, Calif. 90071

Champlin Petroleum Co.
P.O. Box 552
Enid, Oklahoma 73701

Chevron Oil Products
3200 Broadway, S.E.
Albuquerque, N.M. 87102

Chevron USA
El Segundo Refinery
El Segundo, Calif. 90245

Continental Oil Co.
4036 Broadway, S.E.
Albuquerque, N.M. 87102

Continental Oil Co.
P.O. Box 1267
1000 South Pine
Ponca City, Oklahoma 74601

Department of Transportation
Office of Pipeline Safety
Oil and Hazardous Materials
Washington, D.C.

Exxon Company U.S.A.
Exxon Building
800 Bell, Box 2180
Houston, Texas 77001

Gas Company of New Mexico
P.O. Box 3308
Albuquerque, N.M. 87110

Getty Oil Company
3890 Wilshire Blvd., Suite 1732
Los Angeles, Calif. 90010

Illinois Power
Decatur, Illinois

Shamrock Oil Products
123 Madeira Drive, S.E.
Albuquerque, N.M. 87102

Shell Oil Company
Martinez Refinery
Marina Vista Street
Martinez, California 94554

Standard Oil Company of California
225 Bush Street, Room 356
San Francisco, Calif. 94104

St. James Terminal
St. James, Louisiana

Sun Oil Co.
Nederland, Texas

Tennessee Gas Transmission Co.
Houston, Texas

Texaco, Inc.
3209 Broadway, S.E.
Albuquerque, N.M. 87105

Texaco, Inc.
P.O. Box 2100
Denver, Colorado 80201

Texaco, Inc.
P.O. Box 2389
Tulsa, Oklahoma 74101

Texas Eastern Transmission Corporation
921 Main, Box 2521
Houston, Texas 77001

Transcontinental Pipeline Co.
Houston, Texas

Union Oil Company of California
461 South Boylston
Los Angeles, Calif. 90051

DISTRIBUTION:

Department of Energy
Office of Safeguards and Security
Washington, D.C. 20545
Attn: H. E. Lyon, Director (10)

Department of Energy
Strategic Petroleum Reserve
Washington, D.C. 20461
Attn: Vincent C. Baron (10)

1700 W. C. Myre
1710 V. E. Blake
1730 C. H. Mauney
1733 T. J. Hoban
1734 W. N. Caudle
1739 J. D. Williams
1750 J. E. Stiegler
1754 J. F. Ney
1758 C. E. Olson
1758 W. K. Paulus
1758 V. E. Romesberg
1760 J. Jacobs
1761 T. A. Sellers
1763 I. G. Waddoups (5)
1763 R. C. Holt
1763 S. C. Roehrig
1764 J. H. Hinde
2325 R. F. Ashmore (5)
3141 C. A. Pepmueller (5)
3145 W. R. Dameron
3151 W. L. Garner (3)
For DOE/TIC

Mr. DINGELL. I think that would be very helpful. You will recall I am not altogether comfortable with the security on nuclear matters down there. There are a number of inquiries as to how that is going forward. I certainly hope, if you get a little time, you will take a look and see how those folks are doing down there, because I am not satisfied they have still made correct concerns expressed for the security there.

Gentlemen, we kept you over long. It is almost 2:30. We thank you for your assistance.

The subcommittee stands adjourned.

[Whereupon, at 2:20 p.m., the subcommittee was adjourned.]



