A RAND NOTE

EVALUATING THE PROPOSED TEST DRAWDOWN AND SALE OF STRATEGIC PETROLEUM RESERVE OIL

Daniel F. Kohler, Stanley R. Besen, William Krase, Richard Pei, Mary Anne Doyle

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This Note was prepared for the Office of Energy Emergencies of the U.S. Department of Energy, under Contract No. DE-AC01-82EP12128 (Task 4). It is part of Rand's research program on energy emergency preparedness and should be of interest to policymakers concerned with the proposed test sale and drawdown of oil from the Strategic Petroleum Reserve.

Presented here is an evaluation plan designed to aid Department of Energy officials in assessing the results of the proposed test sale. It provides a framework for evaluation of the sale and should help to identify problems that can be avoided in future drawdown operations.
SUMMARY

Under the authority of the Energy Policy and Conservation Act (EPCA) of 1975, the Department of Energy maintains and operates the Strategic Petroleum Reserve (SPR). In the event of an energy emergency, the President would initiate a drawdown of the Reserve to counter the harmful economic effects of a severe shortage in oil supplies.

To prepare better for an emergency, DOE has conducted several exercises to test the Reserve's administrative and operational systems. Two recent exercises, DIREX-B and SPRITE-II, tested procedures and provided a training opportunity for SPR personnel without physically moving any oil or involving firms that might be buyers of SPR oil in an emergency. Other exercises, such as Quick Draw-I, tested the mechanical systems used to remove oil from the storage caverns and move it to the loading docks. However, thus far, no exercise has simultaneously tested the administrative and mechanical systems, nor included any potential buyers for SPR oil.

In 1984, DOE planned a test drawdown and sale of SPR oil. This exercise would, for the first time, have involved the sale of a small amount of SPR oil to the highest bidders, and would have tested simultaneously the operation of all SPR subsystems. At this time, however, no test has been authorized by the Congress. This Note lays the groundwork for the evaluation of such a test.

Some of the objectives of the proposed test are difficult to evaluate. Some are contradictory and inconsistent with the test design, which had to satisfy a number of additional goals, such as limiting costs to the government. In the desire to limit costs, a minimum price was proposed. However, such a minimum price will likely discourage private bidders, thus undermining the objective of "providing for private sector participation." Aware of this, the test planners propose waiving some of the more onerous requirements of the SPR Standard Sales Provisions (SSPs) to induce wider private sector participation. Such a waiver, however, runs counter to the objective of providing for additional training of SPR personnel in all aspects of the drawdown and
sale of SPR oil, and familiarizing the private sector with all aspects of the SPR sales procedures. Neither government personnel nor private firms will gain experience in implementing and complying with the more controversial aspects of the SSPs if they are not included in the procedures employed in the test. As a result, we conclude that some of the primary objectives of the test cannot be evaluated directly, and only some derived subobjectives that the test addresses can be evaluated.

The proposed test will take place under considerably less stringent conditions than would prevail in an emergency. Much less oil will be sold, and most tasks and activities will take place under much less time pressure. Under such circumstances, it is necessary that the evaluation criteria be tightened to avoid obtaining a misleading impression of the system's ability to perform under genuine emergency conditions.

For those questions that cannot be answered with data from the test alone, we propose a survey of all recipients of the Notice of Sale, to be administered simultaneously with the test. The individual responses from this survey would be kept confidential. The main purpose of the survey would be to determine how different private firms view the SPR, and whether they would be likely buyers in a real emergency, even if they did not participate in the test.


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1. INTRODUCTION

BACKGROUND

The Energy Policy and Conservation Act (EPCA) of 1975, Public Law 94-163, authorized the creation of a Strategic Petroleum Reserve (SPR). In an energy emergency, the Reserve would be drawn upon to mitigate the harmful effects of a shortfall in oil supplies. The Act mandates the development of a Strategic Petroleum Reserve Plan and a Distribution Plan setting forth the method of drawdown and distribution of the SPR. The present plan calls for the drawdown of the SPR through auctions involving private sector participants. The viability of such a strategy depends upon (1) the capability to physically withdraw crude oil from storage sites and deliver it to the commercial distribution system, (2) the effectiveness of the Department of Energy's decisionmaking and administrative process associated with the sale of SPR oil, and (3) the willingness of the private sector to employ the SPR.

The Energy Emergency Preparedness Act of 1982 required that a new Distribution Plan, establishing procedures for the sale of oil from the SPR during an drawdown, be transmitted to the Congress. The new Distribution Plan, SPR Amendment No. 4, provided that the principal method of distributing SPR oil will be price competitive sale. After a Presidential decision to draw down the SPR has been reached, DOE will issue a Notice of Sale, announcing the amounts, types, and locations of the SPR petroleum to be sold, the delivery points, and other pertinent information. The proposed Standard Sales Provisions (SSPs) require that a bidder for SPR oil unconditionally accept all terms and conditions made applicable to that sale by the Notice of Sale and offer at least the minimum price specified in the Notice of Sale. The SSPs establish four measures to assure purchaser performance and financial responsibility:

Additional strategies, such as the sale of options using forward-based markets, have been proposed. (See, for example, Kelman et al., 1984.) An examination of these alternatives is, however, beyond the scope of this Note.
1. An offer guarantee,  
2. A payment and performance guarantee,  
3. A provision for liquidated damages, and  
4. Termination for default remedies.

The SPR procedures are described in the Drawdown Management Manual.\(^2\) A flowchart (Table 3-3 in this reference) gives an overview of the functional and information flow for all of the anticipated events in an SPR drawdown and sale. During an energy emergency, after various options have been evaluated and the President directs use of the SPR, actual drawdown activities at DOE are organized according to three phases known as Alert Levels. To coordinate implementation of the SPR Drawdown Management Plan, specific responsibilities are assigned under Alert Levels I, II, and III to DOE personnel. The Drawdown Management Manual presents these implementation activities in 50 activity blocks that can be grouped into six phases for the purposes of our evaluation:

1. Make SPR use-decisions--23 activity blocks.  
2. Establish operational readiness--4 activity blocks.  
3. Award sales contracts--7 activity blocks.  
5. Bill and collect payments--4 activity blocks.  

**THE DRAWDOWN TEST**

The test will include all activities associated with the actual sale, drawdown, and distribution of SPR crude oil, i.e., all activities after the President has authorized use of the SPR, and conclude with a return to normal operations. Performance of these activities will involve all actions required to place the SPR on drawdown alert levels II and III, issue the Notice of Sale, evaluate offers, award contracts,

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\(^2\)Interim Draft Report, Revision 3, April 1983. This manual is currently under extensive revision based on the lessons learned in SPRITE-II.
withdraw oil from storage and deliver it to SPR distribution terminals, schedule deliveries to buyers, transfer custody and title of oil, invoice purchases, and collect payments. All of these actions will be tested in real time. Details of each activity block may be found in the Appendix of the cited reference.

To demonstrate the physical drawdown and delivery capability and examine the decisionmaking and administrative processes, DOE has carried out a number of simulations. Some of these have involved the use of emergency scenarios in order to test the ability of DOE decision makers to evaluate information and respond to an energy emergency. Others have involved the processing of simulated private sector bids for SPR oil. However, it has been recognized for some time that a test that would involve the actual drawdown, sale and distribution of oil, is needed to provide additional data regarding DOE's ability to sell SPR crude oil in an emergency. The feasibility of such a test has been studied and established and a draft test plan has been developed in accordance with instructions set forth by Secretary of Energy Donald P. Hodel on January 31, 1984.

The draft test plan places primary emphasis on those areas not tested in prior exercises. Specifically, the test is designed to address issues surrounding the actual sale and delivery of oil to the private sector. With a view to "minimizing the cost to the Government and benefitting the Department's emergency preparedness effort," the following primary test objectives have been established by DOE:

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4There also has been considerable expression of Congressional and public interest in an actual drawdown test. For information on the public debate see, U.S. House of Representatives Committee on Energy and Commerce, Subcommittee on Fossil and Synthetic Fuels, Strategic Petroleum Reserve 98th Cong., 1st sess., February 17 and June 30, 1983.
6Department of Energy, "Plan for a Test Sale and Distribution of Strategic Petroleum Reserve Oil," Draft, March 29, 1984. Needless to say, minimizing cost and maximizing benefits are conflicting goals that need to be balanced.
(1) To demonstrate the capability to sell and physically deliver SPR crude oil to the commercial distribution system through the various modes available for drawdown (e.g., pipelines and naval vessels).

(2) To provide an opportunity for private sector participation in a physical SPR drawdown test and further evaluation of the procedures for the required interfaces between purchasers, DOE personnel, and terminal operators.

(3) To provide for additional training of management, administrative, and operational personnel associated with an SPR drawdown.

(4) To identify appropriate enhancements to SPR operational and sales procedures.

The draft test plan consists of five major elements:

(1) A total quantity of 1.1 million barrels would be drawn down and offered for sale, with delivery occurring over a 30-day period.

(2) Oil would be drawn down from all operational SPR sites, except Sulphur Mines (one-cycle drawdown design), and delivered to all three SPR distribution terminals, Seaway, Sun, and St. James.

(3) The amount to be sold would permit the outloading of one nominal size tanker (300,000 bbls) at each of the three SPR marine terminals as well as pipeline deliveries of 100,000 barrels (nominal lot size) from the St. James and Sun distribution terminals.

(4) The test would involve one sales cycle with a 30-day delivery period.

(5) The test would occur in the summer of 1985.7

DOE's responsibilities in connection with the test are to conduct an objective evaluation, measuring or estimating the Department's performance in meeting the test's goals and objectives. The emphasis of the evaluation will be on the operational aspects of a drawdown test.8

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7At this writing (August 1985) the test is planned for late fall 1985.

8Discussion Paper, "Test Sale and Distribution," DOE/PE.
THE EVALUATION PLAN

The Department of Energy has contracted with The Rand Corporation to provide DOE with technical assistance in developing an Evaluation Plan. Rand has had no input into the design of the proposed test.

An evaluation process must begin with the identification of criteria against which the evaluation is to be made. In most cases, the relevant criteria flow from the goals or objectives to be achieved. The drawdown test is no exception. In the interest of comprehensiveness, we have made a concerted effort to review systematically the objectives and elements of the test plan with those in DOE who are knowledgeable about the various areas encompassed by the test plan.

In discussions with DOE personnel, it soon became apparent that there is considerable latitude in the interpretation of the test objectives. For example, while the test has been described by some as a physical demonstration of SPR logistics and equipment, others view it primarily as a training exercise for SPR and industry personnel. Our proposed Evaluation Plan is thus predicated on our understanding of the test objectives and our best effort to reconcile and accommodate varying opinions, without sacrificing coherence.

The test objectives were formulated while Congress and the administration continued to debate the overall objectives of SPR drawdown policy. The proposed method for distributing SPR oil during the test sale, an open auction, was the target of much attention and criticism in a series of subcommittee hearings in the House.\(^9\) Testimony from administration officials supported an auction open to all comers, rather than one limited to domestic refiners and producers, as the most efficient method for relieving upward pressure on world oil prices during a crisis.\(^10\) Some industry and consumer groups, on the other hand, maintained that large oil companies would dominate an auction to the exclusion of independent refiners.\(^11\) It was argued that large firms are

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\(^9\)See U.S. House of Representatives, op. cit.
able to stock incremental reserves to cushion the immediate impacts of an oil supply disruption, thereby enabling those firms to place a higher bid for SPR oil while still maintaining an average cost lower than that of a bidder who depends upon SPR oil for continuing operations in a severe shortage. These competing interests are reflected in the choice of test objectives. Because of the underlying political disagreement, some test objectives receive more emphasis in the test design while lack of consensus inhibits precise definition of other test objectives.

Our approach to the Evaluation Plan consists of two parts: First, we examine the principal objectives as stated in the test plan and derive, in some detail, subobjectives that are amenable to more rigorous analysis. In this manner, it will be possible to determine, with a minimum amount of ambiguity, whether the objectives of the test have been achieved. Second, we propose a quantitative scheme, based on an internally consistent analytical framework, that permits scoring of each activity performed during the test. The scores will provide a basis for determining where future efforts to improve the performance of the SPR should be directed.

Section II of this Note presents a detailed discussion of the primary test objectives and derived subobjectives, as well as their implications for the test evaluation. It also sets forth the relations among the criteria that will be used to indicate whether the objectives and subobjectives have been achieved and the likelihood that each subobjective is being meaningfully tested under the given test plan.

Section III presents the quantitative scheme and the scoring procedures, with detailed explanations of the rationale underlying the analytical framework. While the answers to a number of questions may be inferred from the results of the planned test, other crucial ones can only be obtained directly from refiners or other potential bidders for SPR oil. For this reason, this Evaluation Plan also proposes a survey that can be administered as part of the test. The findings are then summarized in Sec. IV.
II. EVALUATING THE OBJECTIVES OF THE SPR DRAWDOWN SYSTEM'S TEST

PRIMARY OBJECTIVES

Section 161(d) of the EPCA restricts use of the SPR to mitigate harmful effects of a severe energy supply disruption as ordered by the President. The EPCA, the SPR plan, and the Drawdown Plan constitute a set of legal requirements prescribing when and how the SPR can be employed (see Figure 1).\(^1\)

According to the Draft Test Plan,\(^2\) the primary objectives of the SPR drawdown test are to:

1. Demonstrate the capability to sell and deliver SPR crude oil
2. Provide an opportunity for private sector participation
3. Provide for additional training of SPR personnel
4. Identify further enhancements of SPR procedures

Evaluating the test involves a determination of whether these objectives have been met. Unfortunately, as stated, the objectives are not operational, and it does not appear possible to ascertain whether they have been achieved. Modifications made to the sales contract, or Standard Sales Provisions, for purposes of the test allow a greater emphasis on testing procedural and administrative objectives to the detriment of the test's operational objectives. The modifications were considered because the SSPs "represent additional administrative burden with associated costs over normal commercial transactions which will be available to potential offerors during a test sale." Among the provisions for which modifications were discussed were offer guarantees, payment and performance guarantees, liquidated damages, and payment terms. Subsequently, it was learned that DOE plans to waive the payment

\(^2\)Department of Energy, "Plan," pp. 8-9. This document may be substantially revised if Congress authorizes the test sale.
and performance guarantee and liquidated damages provisions during the
conduct of the SPR test.¹

Part of the problem is that reasonable people can disagree on
whether the test "provided an opportunity for private sector
participation," or "identified further enhancements of SPR procedures." Even "demonstrating the capability to sell and deliver SPR crude" is not
as clearcut an objective as it might seem. As we shall see, these
problems are aggravated by the test design, which had to accommodate a
number of additional constraints and objectives, such as limiting costs
and utilizing all three distribution terminals.

One way by which the test objectives may be made somewhat more
operational is to derive subobjectives. This process helps not only to
define the objectives more clearly, but also makes it possible to link
at least some of the subobjectives to individual tasks that can be
evaluated. We must stress, however, that the subobjectives discussed in
the remainder of this section were derived by us on the basis of the
Draft Test Plan and our discussions with DOE officials. They are not
necessarily complete, and other parties, such as the Congress, for
example, may have additional subobjectives in mind.

DERIVED SUBOBJECTIVES
Demonstrate the Capability to Sell and Deliver SPR Crude

This appears to be the most important of the test objectives. A
successful demonstration of DOE's capability to sell and deliver SPR
crude might convince the private sector that the Strategic Petroleum
Reserve constitutes an efficient complement to private stockpiles.
Furthermore, public support for the SPR is crucial, and it is less
likely to be forthcoming if the public has doubts about the capability
to draw down and deliver SPR oil.

¹ According to SSP requirements for an emergency drawdown,
purchasers of SPR oil are not allowed to declare "force majeure". If an
unavoidable accident or an act of God prohibits a tanker from accepting
delivery at an SPR terminal, the purchaser must pay costs incurred by
the government due to the delay in schedule. Such a potentially costly
condition might deter test participation and, therefore, provides a
rationale for the waiver. As a result, the liquidated damages provision
may be waived for the test. In an actual emergency, the potential cost
of liquidated damages might also provide an industry rationale for
learning to rely on sources other than government stocks during a severe
shortage.
We have derived two subobjectives from this primary objective:

1.1 Demonstrate the ability of the physical delivery systems (pipelines, loading facilities, etc.) to move oil to buyers.

1.2 Demonstrate that the private sector can absorb and refine SPR oil. This includes silencing rumors that question the quality of SPR oil.

If the test succeeds without any major problems, subobjective 1.1—demonstrating the capability of the physical delivery system—will have been attained. However, the amount of petroleum to be delivered is so small that delivery may (depending on the size of individual sales) be completed before pumps and pipelines approach their rated delivery capacity. The current test plan calls for the sale of 100,000 barrels per pipeline in deliveries from the St. James and Sun distribution terminals\(^4\) and one nominal size tanker delivery (300,000 bbls) from each of the three terminals (including the Seaway terminal). Successfully handling such a small amount will not demonstrate an ability to draw down and deliver the large amounts of oil contained in the Reserve that must be made available during a severe shortage. It is doubtful, therefore, that many individuals will be convinced on the basis of this test alone that the physical delivery system is adequate.\(^5\)

The test as designed is not the best means of demonstrating this capability, nor should this be its major goal. Many aspects of the SPR emergency response system have already been successfully tested. For example, a previous test, Quick Draw-I, involved the physical movement of oil from the storage sites to the distribution terminals.\(^6\) The proposed test will, however, indicate whether all the many valves,

\(^4\)Some industry sources indicated that the Texoma pipeline from the Sun terminal was being converted to a natural gas pipeline, as is the Seaway pipeline, and will no longer be available to ship SPR crude. This may necessitate some changes in the test plan.

\(^5\)In the next section we propose an evaluation method that will partially offset this drawback.

\(^6\)See Attachment C to the Draft Test Plan, March 1984.
pumps, controls, and personnel can be caused to act in a controlled and coordinated way. This will not require detailed monitoring of the drawdown. If there is a shortfall in the physical delivery system, it will be immediately apparent because oil will not be delivered as scheduled, or some activities will take longer than anticipated. Given the evaluation methodology proposed in Section III, this will be evident in adjusted performance scores\(^7\) substantially below par for the activities associated with the physical movement of oil.

Attainment of this subobjective will be assessed by measuring the timeliness of delivery of the oil. This can be done by comparing the schedule of oil delivery, as proposed by the SPR Project Management Office (SPR/PMO), and the record of actual delivery (including amount and time), as attested to by the Defense Contract Administrative Service, the DoD organization that monitors custody transfers and oil movements for SPR.

Whether the second subobjective--demonstrating that the private sector can use and refine the SPR oil--is attained, will also be self-evident if the test succeeds. It is likely that a purchaser who finds the SPR oil to be useless will demand his money back and bring suit, if necessary. However, this outcome is very unlikely, given the SPR's quality control procedures. From our discussions with DOE officials and private sector representatives, we gained the impression that much of the unease surrounding the issue of SPR oil quality is the result of incomplete information, rather than evidence of clear quality flaws. The test may provide a unique opportunity for making more information available to potential bidders.

The SPR includes provisions, using automatic in-line samplers, for taking samples at the loading dock or inlet to a distribution pipeline. These samplers can be adjusted to give a representative sample of the entire stream sold, by varying the sequence, frequency, and amount of "grab" of individual increments. These samplers should be used as the basis for quality adjustments to price. It is important to use the sampler at the loading dock, rather than to rely on samples taken from the storage caverns, because of the many possibilities for contamination before delivery to the buyer, and because the pipeline volume is of the

\(^7\)The adjusted performance scores are discussed in Section III.
same order as possible sales. The SPR should, for its own evaluation, take representative samples and make a thorough analysis of the oil just before delivery to the customer. This should include all the parameters referred to below, and permit a detailed comparison with similar analyses made earlier on samples from the caverns.

However, at the time when these samples are being taken, private buyers will already have made their bids. While some oil companies insist that they can refine virtually anything ("road tar if necessary"), they all insist on knowing precisely the quality of oil in a shipment on which they are bidding. The product yields, and hence the refiner's margins, depend crucially on the quality of crude used and on the specific refining processes that can be applied. Furthermore, each refinery is fitted for a specific refining process that can handle only some qualities of oil. Retrofitting a refinery to run a single batch, such as would be the case for oil purchased in the test, is out of the question.

The information presently available from the SPR lists the major quality characteristics (API gravity, sulphur content, etc.), but fails to provide a complete list of impurities. Two types of impurities that are not presently measured have a potentially important impact on refi

- Trace metals—especially nickel and vanadium—can permanently poison the catalysts used in Fluid Catalytic Crackers (FCC) and result in high catalyst replacement cost. Alternatively, if FCC treatment is not used, the yield of valuable product will be substantially reduced. The presence of trace metals is associated with the oil source, but oil in the SPR has been mixed from several sources, so that the metals content cannot easily be inferred. Metals content is relatively straightforward to measure, but such measurements have not as yet been made available for any of the SPR streams.

- Organic chloride, resulting from the use of any one of several chlorinated hydrocarbons (including tetrachlorobenzene, carbon tetrachloride and perchloromethylene) as solvents in cleaning pipelines, storage tanks, tankers, and even oil wells, is
important to a refiner because its breakdown products are highly corrosive to the steel piping of a refinery and because one product is a highly poisonous gas, phosgene. Even in ppm concentrations, it is a cost and safety concern. (Inorganic chloride can be removed by water washing.) Although use of these solvents has largely been discontinued for those reasons, some of the oil in the Reserve is relatively old and may contain significant organic chloride. The analyses given in the Federal Register as of January 1984 give the chloride content for only two streams. The remainder are to be determined. The stream for which organic chloride is highest is Bryan Mound Maya, a stream that is not proposed to be sold in the Draft Test Plan, but the lack of measurement for the other streams will raise doubts for potential buyers. If chloride content is high, the refining procedure for a small lot may simply be to use low-temperature distillation only, and accept a relatively poor product slate.

These impurities have the effect of reducing the marketability of the SPR oil. In most cases, however, there are ways in which refiners can handle the problems, if they have all the relevant information. Rumors about the poor quality of SPR oil harm the SPR even more than the presence of some impurities in some of the oil. The measurable result may be an unwillingness of the private sector to purchase SPR oil, which would find its expression in heavily depressed prices. This can best be avoided by complete measurements on all the streams in the reserve, prior to the sale offering. Since the test sale and drawdown are unlikely to occur for some time, there is time for such testing.

The test sale is not intended to track any oil shipments beyond the loading point. Nor is any condition imposed that the oil be refined within a specified time or delivered to any specified place. Therefore there can be no assurance that the refinability of the oil will be tested. For example, a supplier to the reserve might buy oil, put it in a tanker, wait some time and return it to the reserve, as part of the long-term contracted delivery. In more ordinary cases, a refiner will

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*This may not be too far-fetched. Even though DOE/SPR openly
not be obligated to reveal details of his refining procedures or costs--
that would be commercial information of value to him.

A refiner faced with a new feedstock will carry out detailed
analyses of it before committing to a full refinery run. It is unlikely
that SPR oil will pose refinery problems not already met and solved.
What the SPR would like to know, but cannot learn from the proposed
test, is what refining cost penalties are associated with oil
contaminants. In any case, only four of the eight streams are planned
to be sold. The other four, including the stream with the highest
chloride content so far measured in the reserve, will pose different
refining problems.

Discussions with refiners will be helpful, especially if full data
are available on trace contaminants, but since discussions will be in a
sales environment, cost information will be suspect. If full quality
information were provided, and no minimum price were imposed, some of
that information would be revealed indirectly through the prices
offered. However, given the current test plan, the survey we propose
later in this Evaluation Plan may be the only way of obtaining some
partial answers.

**Provide an Opportunity for Private Sector Participation**

By virtue of the fact that the bidding procedure is open to all
interested parties, and that some oil will actually be sold to the
highest bidders, this objective will be achieved, although this
"achievement" is little more than a tautology. In order to have any
meaning it is necessary that many potential buyers participate in the
test.

From the SPR's point of view we see this primary objective
encompassing three subobjectives:

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states that re-purchase of oil sold in the test is not planned, and may
even be forbidden, it may be impossible to determine the precise origin
of a shipment of oil received. Some modifications to the SSPs, designed
to reduce this possibility, have been suggested and can be found in
Appendices B, C, and D of the DIREX-B Assessment Report (DOE, February
1984).
2.1 Familiarize a substantial number of private sector participants with the operating procedures of the SPR, especially the Standard Sales Provisions.

2.2 Test the different clauses of the SSPs (liquidated damage provisions, bid bonds, payment schedules etc.) to evaluate their effect on the private sector's willingness to bid and the likely prices offered.

2.3 Determine who are the most likely buyers of SPR oil.

A purchaser's decision to participate in the test will depend on the material advantages he hopes to gain. In a time of abundant oil supplies and depressed prices, and given the various conditions attached to buying oil from the SPR that are not present in private transactions, it is unlikely that many buyers will be able to realize a substantial profit on the oil actually purchased. Nevertheless, a private buyer may decide to participate if he expects the test to provide information that would be useful to him in an actual emergency drawdown.⁹

Unfortunately, however, the nature of the proposed test severely limits any comparisons between the test sale and actual emergency conditions. It is unavoidable that conditions in the oil markets will differ greatly in a test from those in an emergency. But the information most valuable to purchasers will come from the bid evaluation process and the application of the Standard Sales Provisions, and here the differences between the test sale and an emergency drawdown are avoidable.

If one of the subobjectives of the test is to familiarize private sector participants with SPR procedures, this objective cannot be accomplished if those procedures are modified for the purposes of the test. However, this is precisely what is being proposed. In its Discussion Paper entitled *Test Sale and Distribution of Strategic*

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⁹It should be noted that most of the larger oil companies with whom we spoke believed that they could quickly become familiar with the SSPs during an actual emergency, so that they would have only limited incentives to participate in the test simply to enhance their understanding of the sales process. However, the same may not be true for smaller oil companies, independent refiners, and traders, who might make up a large share of the SPR's potential customers.
Petroleum Reserve Crude Oil, DOE staff indicated that "The test plan proposes to make maximum practicable use of the established sales process and Standard Sales Provisions," but suggests "some modifications could be made to reduce cost and encourage industry participation in non-emergency conditions." The drawbacks of such modifications are obvious, if one considers that the payment and performance guarantees contained in the SSPs are quite different from those typically involved in the purchase of crude oil in private markets, and thus are likely to be quite unfamiliar to oil company participants. Since these provisions are not present in the proposed test, potential participants will not become familiar with them by participating in the test.

Future bids for SPR oil will be based on the criteria used by SPR management in award recommendations, and on the estimated costs associated with both successful and unsuccessful bids, which depend on how the SPR/PMO interprets the SSPs. Attempts to encourage private sector participation in the test through modifications of the provisions are, therefore, a two-edged sword. While some bidders might be encouraged to participate in the test sale, many more might be discouraged. Why should they invest resources to buy a relatively small amount of oil while gaining little practical information that might be useful in a real emergency?

The problem being faced here is the result of a number of fundamental inconsistencies in the objectives of the test and the constraints imposed on its conduct. The fact that the SSPs "represent additional administrative burden with associated costs over normal commercial transactions" does not, by itself, mean that participation in the test will be limited. If buyers can discount their offers to reflect these increased costs, they should be indifferent between purchasing SPR oil during the test and employing "normal commercial transactions." But in order to limit the cost to the government of conducting the test, a minimum price will be set. This, in turn, may make adequate discounting of bids impossible so that, if participation is to be encouraged, some of the SSPs must be waived. We thus come full circle because to the extent that these provisions are waived, the private sector cannot become familiar with them through the test.
It is recognized generally that the SSPs impose costs on private sector participants over and above those that they incur in purchasing petroleum in private markets. But achievement of the second sub-objective--testing the effects of these added costs on buyer's willingness to deal with the SPR--is hampered by many of the same concerns as the first. As indicated above, some of the SSPs will not be present during the test and the effect of any provision not present in the test cannot, of course, be evaluated.

However, there are additional reasons that make it impossible for the test to provide much information on this crucial topic. Potential buyers for whom the costs of the remaining SSPs exceed the difference between the market price of petroleum and the minimum price established in the SPR test will not bid. By limiting the range of offers that will be considered, the test may lose information that would be useful in determining the costs of the SSPs to private buyers.

Those who designed the proposed test were aware of the possibility that only a handful of private firms might be willing to participate in the test. Several ways of correcting this situation were considered. Some openly talked about "encouraging" private firms to participate in the test by appealing to their patriotism or sense of civic duty. But if buyers are "encouraged" in this way to participate in the test, their bids will not reflect the economic costs of the SSPs to them. In such a case, the bids cannot be used to assess the effect of the SSPs, and it is likely that a large number of bids will occur at the minimum price.

Finally, even if all of the SSPs were present during the test, and even if there were no minimum price provision, it would be possible only to assess the cost to buyers of all of the SSPs combined. Where all of the provisions are present in a "bundle," their separate effects cannot be assessed. Thus, to the extent that DOE is concerned with the separate costs of each of the provisions, it would be necessary to conduct a test of the SSPs that is quite different from the one that is proposed.10

10 The Discussion Paper provides conjectures about the quantitative effects of a number of the SSPs, but the proposed test cannot test any of these conjectures.
It is incorrect to assume that the increased costs imposed by the SSPs weigh equally on all private firms interested in purchasing SPR oil. Obviously, the location of the reserves will differentially affect potential buyers. Other things being equal, those buyers whose refineries are closest to the reserves will be the most likely purchasers. Similarly, some buyers may find it easier than others to comply with the bid bond and performance guarantee provisions. A test sale could, in principle, determine which buyers are most likely to find SPR purchases attractive. This information might be useful in modifying the SSPs that impact most heavily on particular groups of buyers. For this reason, we have included the third subobjective—determination of most likely bidders—under this heading.

Unfortunately, however, a number of features of the proposed test make it unlikely that such information will result. First, to the extent that some SSPs are waived for the purposes of the test, it will be impossible to determine which potential buyers find these provisions especially onerous. Thus, to the extent that increased participation is sought in this manner, the test will prove less useful in providing information than it might otherwise be.

Second, to the extent that certain provisions are not waived during the test that are likely to be waived during an actual emergency, the test will reveal less about the identity of buyers in an emergency than it would otherwise. Of particular relevance here is the Jones Act, which many believe would be waived in an emergency. The Act prohibits the transportation of merchandise between points in the United States on foreign vessels, with certain exceptions made for Canadian vessels engaged in traffic on the Great Lakes. The protective tariff on American shipbuilding makes transportation by water, or land and water, an expensive proposition. The effect of enforcing the Jones Act during the test is likely to be to discourage buyers from all but the Gulf Coast and the East Coast south of Cape Hatteras, from bidding for SPR oil delivered by ship.

Third, if a minimum price provision exists during the test, it will be impossible to differentiate between those non-bidders who find the SSPs and other provisions only a small deterrent to bidding and those
for whom they are large impediments. In effect, the minimum price provision truncates the distribution of bids and thus results in less information about potential bidders than would otherwise be the case.

Finally, to the extent that firms bid for oil because they have been encouraged to do so, we will learn the identities of firms that are most susceptible to such pressures, not which firms are most likely to bid for SPR oil during an actual emergency.

Provide for Additional Training of SPR Personnel

Training SPR personnel in the activities involving the physical movement of oil (i.e., operating pumps and pipelines, etc.) has been carried out in previous exercises. Due to the limited amount of oil involved in the proposed test, there appear to be little if any additional training effects in this area that might be forthcoming. That leaves only two subobjectives that can be listed under this heading:

3.1 Expose the SPR personnel, especially the procurement and finance departments, to a situation in which their decisions will involve the transfer of substantial sums of money from private buyers to the government.

3.2 Test bid-evaluation and decisionmaking under real-life conditions.

There have been previous tests of the ability of the SPR staff to process bids.\textsuperscript{11} However, these tests involved simulated bids and were clearly viewed by SPR staff as only an exercise. Since the proposed test will involve the sale of petroleum valued at approximately $30 million in the open market, it will confront SPR sales personnel with a "real world" test for the first time.

However, the sums involved in this test are minute compared with those likely to be involved in a real emergency, for two reasons. First, the volume of oil to be sold over a one-month period is only

\textsuperscript{11}The SPRITE II exercise was conducted in February, 1983 to test the ability of SPR/PMO to issue the Notice of Sale and process bids received.
about two percent of anticipated monthly sales in a real emergency. Second, the price offered during the test is likely to be substantially lower than the price that would be offered in an emergency. Therefore, during the test sale, SPR personnel will not gain experience in transferring the very large sums of money involved in emergency transactions during the test sale.

Of course, SPR personnel have, for a considerable period of time, been making purchases involving substantial sums of money. Nevertheless, this will be the first time that they will find themselves in a situation where payments go from private firms to the government. The importance of that distinction ought not to be underestimated. Questions of how to deal with delinquent accounts, how to handle pre-payments, whether letters of credit ought to be interpreted as commercial letters of credit, against which the supplier can draw upon shipment, or whether they ought to be performance letters of credit, as is customary for domestic petroleum transactions, are unresolved and are likely to lead to ambiguities during the test.

However, compared with problems likely to occur in a real emergency, payment problems during the test can be expected to be negligible. State and local governments, small utilities, and other bidders without an established track record in the oil market—without experience in dealing with letters of credit, and possibly employing small local banks without much experience in oil markets—will probably not participate in this test. Nor can we imagine a realistic test that might include such buyers. Training SPR personnel in handling these kinds of problems is probably best accomplished by means of simulated exercises similar to DIREX-B and SPRITE-II.

For many of the same reasons, the second subobjective—testing bid evaluation under real-life conditions—will also remain largely unattainable in the proposed test. The bids that the SPR personnel will have to evaluate during the test will probably be quite different in quantity and quality from the bids that can be expected in an emergency. There will be far fewer bids to evaluate and some classes of buyers are unlikely to participate in the test (e.g., state governments, foreign buyers). The environment for test evaluation will have little to do with "real-life conditions."
Nevertheless, if the system being tested were identical to the one likely to be used in an emergency, there would be some training effects present. Unfortunately, the proposed departures from the SSPs lead to SPR personnel exercising a system that is quite different from the one they would be expected to manage in a real emergency. For example, if payment and performance bonds will not be required during the test, SPR personnel will obtain no experience in their evaluation. Since evaluating these bonds is likely to be a complicated undertaking, eliminating them for the test is especially unfortunate. The result is that the training provided by the test will be less valuable than if all of the SSPs were retained.\footnote{SPR personnel have also expressed concern over the possibility that the modified test procedures might be construed by some private buyers as setting precedents for an eventual emergency drawdown.}

Second, because we expect the number of bids to be limited during the test, the range of experiences to which SPR personnel will be exposed will similarly be limited. This shortcoming is separate and apart from the fact that the stress on the evaluation system will probably not be great if the number of bidders is small.

**Identify Further Enhancements of SPR Procedures**

It is our understanding that a network analysis has been completed for the functional flow diagram, and that the relative criticality of different activity paths has been determined in terms of the time available for completion of the associated activities. The sequence of activities and milestones that takes the longest time to accomplish, or the critical paths for the network, has also been generated by a contractor. Unfortunately, neither the network analysis nor the critical path model has been documented.

Independently of these analyses, the test drawdown and sale may be able to help identify possible shortcomings in the administrative procedures. To do so, however, it must be successful in meeting two subobjectives:
4.1 Identify possible bottlenecks in information flow and/or decisionmaking.

4.2 Identify possible ambiguities that might hamper and slow down the drawdown of oil in an emergency (because they require decisions to be made, possibly at high levels.)

We will discuss the evaluation of these objectives separately, for each of the major phases.

*Phase II--Establish Operational Readiness*

The four activity blocks in this phase deal essentially with the setting of appropriate alert levels throughout the chain of command. The activities are sequential and are properly subordinated to the Presidential authorization. The completion of the phase is one of the two essential inputs to triggering the placement of SPR on Alert Level III. In view of its sequential nature and its independence of industry and market responses, it appears that no bottleneck and/or ambiguity could conceivably arise out of this phase, either in the test or in an actual emergency.

*Phase III--Award Sales Contracts*

This phase consists of the handling of the Notice of Sale, the evaluation of purchase offers, the determination of awards and the contractual procedures. Completion of this phase is the other essential input to the beginning of Phase IV. Inasmuch as all the activities in this phase are closely related to industry and market responses, the evaluation of the test plan should be most critical in terms of the test's realism. Since the test sale would probably occur under conditions of abundant supplies and the quantity of oil offered is small, it is highly likely that the responses will be limited.

Not enough bids will be processed to test bid evaluation procedures for complications that, under the pressure of emergency demand, could delay decisions. Credit checks will be done manually on each bid and, in an emergency, could cause delays that will not occur in the test sale because of the reduced incentives for private sector participation. Likewise, the groups of potential buyers likely to be absent are precisely the ones who will require special attention and case-by-case decisions.
The tightening of the performance criteria proposed for these activity blocks in Section III goes a long way towards alleviating this problem. The further breakdown of the activity blocks into smaller sub-tasks also helps in the identification of bottlenecks. One might therefore tentatively conclude that if serious bottlenecks do exist, they will be evident through low adjusted performance scores for the critical activities. However, there is no guarantee that this method will pinpoint every bottleneck. System breakdowns are not always a linear function of workload. If the workload has to be above a critical threshold to cause a problem, it is possible that our method of adjusting the raw performance score will not detect a potential difficulty.

**Phase IV—Drawdown, Delivery, and Distribution of Oil**

Operationally, this is the most complex and error-prone phase of the test. It involves not only critical communications links such as the setting of Alert Level III, but also the coordination of sensitive operational actions such as the scheduling of deliveries and the inspection of oil quantity and quality. There are a large number of looped activities, all of which involve actual operations and are therefore highly sensitive to the volume of bids, awards, varieties, etc. Here the lack of realism can be a true impediment to the evaluation of the test.

The remaining two phases involve mainly documentation and few activities. Our remarks for phase III apply generally to these two phases as well.

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See Section III.
III. EVALUATION BY TASKS

EVALUATING PERFORMANCE UNDER EXCESS CAPACITY

Evaluators should assess not only how well a system performs, but also under what circumstances. The more realistic the circumstances, the more confidence a good performance inspires.¹

Overall, the proposed test sale does not appear to pose serious difficulties. Neither the mechanical nor the logistical and human systems are expected to undergo the stressful conditions of a real emergency. Only a few subsystems will face a realistic test in which their performance will enable the evaluators to draw meaningful inferences. Because most subsystems will operate at considerably below capacity, it would be catastrophic if they could not perform satisfactorily under the proposed test conditions.

Faced with this situation, the evaluator has essentially two options:

1. Restricting the resources allocated to each task for the test, or
2. Weighting the performance measures by an index that reflects the difficulty of the conditions under which the task was carried out.

The two methods, if correctly applied, lead to the same results, and we shall recommend the second, because it seems less disruptive to operating procedures.

Consider a hypothetical task for which the emergency drawdown plan allocates 48 hours. An objective measure of how well this task was performed in a realistic test is the allocated time divided by the time actually used in a test. If this ratio is equal to one, performance was up to par. If it is above one, performance was above par, and if it is below one, performance was below par.

¹For example, consider the sport of diving, where the marks given by the judges for the actual performance, are multiplied by a measure of the "degree of difficulty," determined a priori by a rulebook.
Now consider a test that is unrealistic because the required workload for a task is considerably less than would be expected in an emergency. For the sake of argument, assume that the task requires only half as much work as it would in an emergency. The objective measure outlined above is now of course misleading, and we have to adjust either the test conditions or the evaluation measure to obtain a true picture of how well the job was carried out.

Assume that it took 36 hours to carry out the task in question during the test. Without any adjustments, the performance measure would be $48/36 = 1.333$, comfortably above par. Under method (1) listed above, the time allocated to the task would be reduced from 48 to 24 hours. If it took 36 hours to carry out the task, the performance measure would now be $.667$, considerably below par. Under method (2) we would multiply the unadjusted performance measure by the index of the workload (.5) and arrive at the same adjusted performance measure, $1.333 \times 0.5 = 0.667$.

**THE INDEX OF WORKLOAD**

Obviously, the determination of the index of workload for each task is an important aspect of test and evaluation design. There are no hard and fast rules, and different individuals might differ as to how the workload under the test compares with the expected workload in an emergency. Matters are further complicated by qualitative differences in workload that can only be guessed at and that do not lend themselves readily to the kind of quantitative adjustments proposed here. Ultimately, determining the indices of workload will have to be a judgment call, and it might be advisable to allow for some upper and lower bounds.

Nevertheless, it is important to at least try to determine such indices. Otherwise, a biased and overoptimistic picture of system performance under emergency conditions will result. It is better to use the indices, even if they are only approximately correct, than to pretend that the system has been realistically tested, when in fact it has not. In Table 1 we have listed some weights that might be applied to the various tasks in the proposed test on the basis of the currently proposed test design. The tasks listed correspond to the blocks of the
DOE/SPR System Response Functional Plans Diagram\textsuperscript{2} and the subtasks are taken from the DIREX-B Preliminary Draft Report.\textsuperscript{3} They are listed as examples, and may have to be modified and expanded, once the final test design is known and a new version of the Distribution Management Manual has been published.

It is desirable that the indices to be used in the test evaluation be determined \textit{a priori}. This does not necessarily require that they be numerically fixed prior to the test. The extent to which activities such as the evaluation of bids (blocks 30 through 33) are tested depends very heavily on the number of bids actually submitted by potential purchasers. In this case it would be sufficient to agree on a rule for determining the indices as a function of the number of bids received.

The index of workload should reflect the fact that DOE personnel may find themselves under more stress during a test than in a real emergency. In times of an oil crisis they are empowered to proceed with the sale and distribution of oil, even over the protests of some buyers and the GAO. If they act in good faith, it is unlikely that their decisions will be questioned, as long as the primary objective of getting oil out of the ground and into the private distribution system as quickly as possible is met. During the test, however, their actions will be scrutinized much more closely. The fact that they have to make only very few decisions tends to magnify the problems, virtually inviting detailed scrutiny not only from the government but from the private sector as well. SPR personnel are aware of this, and may well respond by taking every precaution in the execution of their tasks, an understandable response that may significantly slow down the work pace. In order to reflect this, the index of workload may have to be adjusted upward. We propose to set the indices of workload equal to the ratio of bids submitted to bids expected during an emergency plus a moderate adjustment, say +.2, to reflect the particular pressures of the test situation. The number of firms currently on the SPR bidders list could serve as a proxy for the number of bids expected on each line item in an emergency.

\textsuperscript{2} U.S. Department of Energy, \textit{Distribution Management Manual}, Figure 3-3.

\textsuperscript{3} U.S. Department of Energy, April 1983.
Table 1
PROPOSED INDICES OF WORKLOAD AND PERFORMANCE CRITERIA

<table>
<thead>
<tr>
<th>Block</th>
<th>Activities</th>
<th>Index of</th>
<th>Time Allocated$^2$</th>
<th>Workload (or alt.criterion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>ISSUE NOTICE OF SALE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28-1</td>
<td>Eliminate Debarred Offerors</td>
<td>1</td>
<td>4 hrs</td>
<td></td>
</tr>
<tr>
<td>28-2</td>
<td>Prepare Notice of Sale</td>
<td>1</td>
<td>16 hrs</td>
<td></td>
</tr>
<tr>
<td>28-3</td>
<td>Distribute Notice of Sale</td>
<td>1</td>
<td>4 hrs</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>EVALUATE OFFERS TO PURCHASE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30-1</td>
<td>Eliminate Offers Below Min. Bid</td>
<td>3)</td>
<td>4 hrs</td>
<td></td>
</tr>
<tr>
<td>30-2</td>
<td>Eliminate Other Non-Responsive Bids</td>
<td>3)</td>
<td>4 hrs</td>
<td></td>
</tr>
<tr>
<td>30-3</td>
<td>Evaluate Acceptable Offers</td>
<td>3)</td>
<td>16 hrs</td>
<td></td>
</tr>
<tr>
<td>30-4</td>
<td>Determine Financial Responsibility</td>
<td>3)</td>
<td>4 hrs</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>DETERMINE AWARD RECOMMENDATIONS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31-1</td>
<td>Contact Ap. Successful Bidders</td>
<td>.05-.15</td>
<td>8 hrs</td>
<td></td>
</tr>
<tr>
<td>31-5</td>
<td>Deposit Payment(guarantees)</td>
<td>.05-.15</td>
<td>4 hrs</td>
<td></td>
</tr>
<tr>
<td>31-6</td>
<td>Notify PMDC and PODC</td>
<td>1</td>
<td>1 hr</td>
<td></td>
</tr>
<tr>
<td>31-7</td>
<td>Provide Summary of Award Recom.</td>
<td>.05-.15</td>
<td>4 hrs</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>REVIEW AWARD RECOMMENDATIONS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32-1</td>
<td>DAS/SPR Reviews Awards</td>
<td>.05-.15</td>
<td>4 hrs</td>
<td></td>
</tr>
<tr>
<td>32-2</td>
<td>DAS/SPR Advises ERWG</td>
<td>1</td>
<td>1 hr</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>AWARD SALES CONTRACTS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33-1</td>
<td>Prepare Notice of Acceptance (NA)</td>
<td>.05-.15</td>
<td>4 hrs</td>
<td></td>
</tr>
<tr>
<td>33-2</td>
<td>Sign and Transmit NA</td>
<td>.05-.15</td>
<td>4 hrs</td>
<td></td>
</tr>
<tr>
<td>33-3</td>
<td>Notify All Other Bidders</td>
<td>fn3</td>
<td>n.a.</td>
<td></td>
</tr>
<tr>
<td>33-4</td>
<td>Place NA in Commerce Business Dly.</td>
<td>1</td>
<td>n.a.</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>PLACE SPR ON ALERT LEVEL III</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34-1</td>
<td>DAS/SPR Receives Contract Data</td>
<td>.05-.15</td>
<td>1 hr</td>
<td></td>
</tr>
<tr>
<td>34-2</td>
<td>DAS/SPR Provides Direction to PODC</td>
<td>1</td>
<td>1 hr</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>SET ALERT LEVEL III AT PO</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35-1</td>
<td>Verify Operational Capability of MICC</td>
<td>1</td>
<td>4 hr</td>
<td></td>
</tr>
<tr>
<td>35-2</td>
<td>Set Alert III Throughout SPR System</td>
<td>1</td>
<td>1 hr</td>
<td></td>
</tr>
<tr>
<td>35-3</td>
<td>Inform DAS/SPR of Alert Status</td>
<td>1</td>
<td>1 hr</td>
<td></td>
</tr>
<tr>
<td>36/37</td>
<td>SET ALERT LEVEL III AT PMO AND AT SITES</td>
<td></td>
<td>(Subtasks Analogous To Block 35)</td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>COORDINATE DELIVERY SCHEDULES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38-2</td>
<td>COP Determines Buyer Delivery Windows</td>
<td>.05-.15</td>
<td>4 hrs</td>
<td></td>
</tr>
<tr>
<td>38-5</td>
<td>Receive Buyer Info and Develop Sched.</td>
<td>.05-.15</td>
<td>4 hrs</td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>FINALIZE DELIVERY SCHEDULES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39-1</td>
<td>PMODC Reviews and Approves Del.Sched.</td>
<td>.05-.15</td>
<td>1 hr</td>
<td></td>
</tr>
<tr>
<td>39-2</td>
<td>Direct Contractor to Proceed</td>
<td>1</td>
<td>1 hr</td>
<td></td>
</tr>
<tr>
<td>39-3</td>
<td>Request DCAS/QA Support for Certific.</td>
<td>1</td>
<td>1 hr</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>DELIVER OIL TO TERMINALS$^4$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40-1</td>
<td>Notify Site Managers</td>
<td>1</td>
<td>1 hr</td>
<td></td>
</tr>
<tr>
<td>40-2</td>
<td>Deliver Oil</td>
<td>.05-.15</td>
<td>(Prompt.)</td>
<td></td>
</tr>
<tr>
<td>Step</td>
<td>Activity</td>
<td>Time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------</td>
<td>----------------------------------------------</td>
<td>-------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40-3</td>
<td>Document Custody Transfer</td>
<td>0.05-0.15 hrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>RECEIVE, INSPECT AND STORE OIL</td>
<td>0.05-0.15 hrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>41-1</td>
<td>Receive Oil at Terminal</td>
<td>0.05-0.15 hrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>41-2</td>
<td>Prepare and Sign DD 250</td>
<td>0.05-0.15 hrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>INSPECT OIL</td>
<td>0.05-0.15 hrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>42-1</td>
<td>DCAS/QA Inspects Oil and Signs DD 250</td>
<td>0.05-0.15 hrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>RECORD CUSTODY TRANSFER</td>
<td>0.05-0.15 hrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>43-1</td>
<td>PMO Receives and Records DD 250</td>
<td>0.05-0.15 hrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>SHIP OIL TO BUYERS</td>
<td>0.05-0.15 hrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>44-1</td>
<td>Transfer Oil From Terminal to Buyer</td>
<td>0.05-0.15 hrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>44-2</td>
<td>Request Quantity and Quality Cert.</td>
<td>0.05-0.15 hrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>44-3</td>
<td>Complete DD 250 and Notify PMO</td>
<td>0.05-0.15 hrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>RECORD TITLE TRANSFER</td>
<td>0.05-0.15 hrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45-1</td>
<td>DCAS/QA Certifies DD 250</td>
<td>0.05-0.15 hrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45-2</td>
<td>Transmit Copy of DD 250 to Buyer</td>
<td>0.05-0.15 hrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>ISSUE INVOICES</td>
<td>0.05-0.15 hrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>46-1</td>
<td>Review DD 250 and Transmit to Finance</td>
<td>0.05-0.15 hrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>46-2</td>
<td>Finance Issues Invoices</td>
<td>0.05-0.15 hrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>RECEIVE PAYMENT</td>
<td>0.05-0.15 hrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>47-1</td>
<td>Treas. Advises PMO of Receipt of Funds</td>
<td>0.05-0.15 hrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>COMPLETE DELIVERY REQUIREMENTS</td>
<td>0.05-0.15 hrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>48-1</td>
<td>Notify PMODC</td>
<td>0.05-0.15 hrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>49</td>
<td>COMPLETE CONTRACT ADMINISTRATION</td>
<td>0.05-0.15 hrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>49-1</td>
<td>Reconcile Receipts with Invoices</td>
<td>0.05-0.15 hrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>49-2</td>
<td>Issue Invoices for Interest due</td>
<td>0.05-0.15 hrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>49-3</td>
<td>Resolve any Remaining Disputes</td>
<td>0.05-0.15 hrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>49-4</td>
<td>Provide Status Report to DAS/SPR</td>
<td>0.05-0.15 hrs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTES:**

1) Activities of the private sector participants have been omitted.

2) Allocated times are taken from the DIEX-E test plan. They do not reflect any judgment on our part, and will have to be adjusted once the revised Distribution Management Manual is available.

3) For these activities, the index of workload will have to be a function of the number of bids received in the test.

4) If the evaluation is conducted separately for each site, then the indices of workload for these and all subsequent activities associated with the movement of oil may have to be adjusted to reflect the specific workload at the individual sites.

This is the end of this file.
Blocks 38 through 47 are associated with the actual movement and transfer of oil. The extent to which they are tested depends therefore on the quantity of oil sold in relation to the planned drawdown in case of an emergency. The quantity to be sold is currently pegged at 1.1 million barrels, less than 2 percent of the maximum sustainable drawdown expected during one sales cycle (30 x maximum daily drawdown of 2.1 MBD = 60.3 MMB\(^4\)). However, in relation to the respective streams from which the oil will be drawn, the ratio may be higher, depending on which streams are actually chosen for the test sale. There may also be some economies of scale associated with the movement of oil. It may not take twice as many resources to move twice as much oil through an existing pipeline.

As was the case for the bid evaluation tasks, there are also some ways in which the proposed test drawdown may technically and organizationally be more difficult or more complicated than an actual emergency drawdown:

- Planned deliveries to the reserve during the drawdown must be re-scheduled or stored (in tanks, barges, or tankers) at the loading dock, because there is only a single service pipeline to each site.
- The service pipeline (whose capacity is comparable in volume to the projected test delivery) must be emptied into storage at the loading dock, before delivering the specified oil from a storage cavern. Otherwise the demonstration will be faulty in delivering a specified, tested quality.
- Some possible destinations for the oil will require tanker delivery to United States destinations that will require a Jones Act ship. In addition, new environmental regulations require on-board de-ballast cleaning equipment, or the ability to store ballast segregated from the cargo (at a loss typically of about 20 percent, in ship capacity), or on-shore ballast storage and cleaning. (The legal requirement for Jones Act ships is expected to be lifted in a real emergency, and even

\(^4\)DOE, Draft Test Plan, March 29, 1984, p. 3.
some environmental regulations such as the clean de-ballasting might be relaxed.

- The oil to be delivered also must be stored at the dock for separation of BS&W (brine, sediment and water) picked up in the pipeline, and for precise metering.
- Arranging the availability of suitable shipping will be the responsibility of the purchaser. He may have difficulty because there are few Jones Act ships and fewer still with clean de-ballasting. But arranging (and paying for) availability of the extraordinary storage at the terminal evidently will be the responsibility of the SPR. A month, or more, lead time may be required to make the storage available, according to SPR/PMO.

In view of these factors, we may want to increase the indices of workload for the activities involving the movement and transfer of oil. The proposed range of .05 to .15 seems reasonable.

The remaining indices are informed guesses arrived at after discussions with DOE representatives. Some activities, such as issuing the Notice of Sale, will not take measurably less effort under the proposed test than would be expected in an emergency. These activities therefore were given indices of 1 (i.e., 100 percent). As the test design is modified, all of the indices in Table 1 may have to be changed.

Introducing indices of workload, however, is likely to be only a partial solution. Blocks that are performed repeatedly during an emergency drawdown, for example, offer opportunities for "learning by doing." While it might take 12 hours during the test to perform an activity once, it might only take 8 hours on average to perform the same activity repeatedly. It is very difficult to anticipate and to reflect such learning effects in the index of workload.
PERFORMANCE MEASURES AND CRITERIA

The performance of most of these subsystems can be measured as a function of time. For example, the SPR procurement office is obliged to evaluate the offers to purchase within 5 days, and to publish a list of apparently successful bidders within 24 hours after the submission deadline. As outlined above, a numeric score for performance can be obtained by dividing the time scheduled for these activities by the time actually used during the test.

For other tasks, the appropriate performance criterion is the promptness with which they are executed. This applies to tasks that must be carried out at a specific point in time, but do not necessarily require much elapsed time. For example, the oil has to arrive at the terminals at a specific prearranged time. If it arrives sooner, this may be as undesirable as if it arrives too late. It is not obvious how the promptness, as opposed to speed, of the completion of a task should be measured. We propose that once the details of the test drawdown are sufficiently fixed, so that it is known what quantities of oil have to arrive when and where, a schedule be established that includes some tolerances or margins. For example, 200,000 barrels of Bayou Choctaw Sour must begin arriving at the St. James terminal on 19 July between 9 and 11 a.m. Any deviation in arrival time beyond the margins would lead to reductions in the performance score on the basis of a predetermined schedule that would reflect how seriously such deviations might lead to bottlenecks in a real emergency.

A reflection of how effectively some tasks are carried out is whether they lead to any disputes. Quality testing and contract administration tasks fall into this category. If these tasks are carried out effectively, there should not be any disputes with buyers. We propose that the time and promptness criteria for the individual

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5 The times indicated in Table 1 are from the DIREX-B exercise and are not necessarily representative of the criteria to be employed in the test.

6 A distinction will, of course, have to be made between disputes that are clearly due to inappropriate actions by the buyers, and disputes that might have been avoided by better performance by DOE/SPR personnel.
tasks be adjusted by adding the time needed for the resolution of the disputes to the time originally needed for carrying out the tasks.

It is essential that DOE personnel be aware of what evaluation criteria are used and what indices of workload are applied. If the people carrying out the tasks are unaware of this evaluation plan, they may simply adjust their pace to the amount of work they must do: "Work expands so as to fill the time available for its completion." 7

As an organizational matter it may be advisable to construct an evaluation worksheet considerably in advance of the test. In Appendix A, we provide an illustrative example of how such a worksheet might look. By circulating it for comment prior to the test, many questions, especially with respect to the proper indices of workload and measurement criteria, can be resolved in advance.

INTERPRETING THE ADJUSTED PERFORMANCE SCORES

Adjusting the raw performance scores by an index of workload provides a guide for measuring how well a particular task or subtask was executed during the test. However, it does not provide much guidance on how to interpret this measurement. Is an adjusted performance score of .80 reason to worry? It is clearly below par. But how far below par does a score have to be to constitute a failure of the test? Interpreting every score below one as a failure would be as unreasonable as failing every student who achieved a less than perfect score on a test. If only to allow for errors in measurement, and errors in determining the proper index of workload for the case at hand, we must also allow for some tolerance in the interpretation of the scores.

One commonly used method in cases like this is to compare the adjusted performance score with scores achieved by others on the same (or a similar) test. Students taking the same test are grouped into percentiles or graded "on a curve." Progress is measured by how much scores improve from one test to the next. In both cases we compare a particular test score with other test scores so as to decide whether performance in a particular test was acceptable.

Unfortunately we have no adjusted test scores against which we can compare the results of the proposed test. There are no competing systems being put through the same test. Given the high costs associated with a test sale, it seems also rather unlikely that such tests will be conducted repeatedly in the future. The test scores cannot, therefore, conveniently be interpreted by comparing them with other adjusted test scores.

Nevertheless, calculating the adjusted numerical test scores for the different tasks is a worthwhile exercise in the test evaluation for at least two reasons: First, it provides us with an internal ranking of how well individual tasks were carried out relative to each other. It thus enables us to pinpoint those tasks that are most in need of improvement to decide how resources available for system improvement should be allocated. Second, it lays the groundwork for comparing this test with other system tests. While it is unlikely that a full-fledged drawdown and sale of SPR oil will be repeated, individual tasks will nevertheless be exercised in simulations. For example, the tasks associated with the bid evaluation were exercised in SPRITE-II, and are likely to be exercised again. The adjusted performance scores achieved during the planned test sale can serve as a basis for evaluating performance of these tasks in future simulations.

In the near term, however, we will have to make subjective judgments on whether a particular score is acceptable or not. Different people may well come to different conclusions on that point. But the adjusted performance score, and the way in which it was constructed, will at least provide them with a framework for explaining their differences, and help in rationalizing the inevitable discussions on whether the SPR is really "ready."
IV. CONCLUSIONS

The proposed test of the Strategic Petroleum Reserve has several, partly inconsistent, objectives. Based on an analysis of the proposed test and interviews with government and industry personnel, we have come to the conclusion that only limited inferences will be possible. In part this is because no test can faithfully reproduce emergency conditions. However, some of the shortcomings of the proposed test are self-inflicted.

We have proposed countering some of the difficulties in drawing conclusions about the performance of the SPR during an emergency by adjusting the performance scores achieved in the test with the help of an "index of workload." We believe that this procedure may take us a long way towards simulating some realism and placing the test results in perspective. Nevertheless, there still remain a considerable number of problems that our proposed adjustments cannot remedy. Some of these limitations are inherent in any test, and cannot be overcome by any test or evaluation plan. However, some problems are not due to the inherent limitations of testing a system designed for emergencies under non-emergency conditions, but are the result of test design choices and conflicting test goals. These shortcomings have led us to consider sources of information other than those generated during the test that may be used in reaching judgments as to the adequacy of the SPR drawdown and distribution system.

INHERENT LIMITATIONS OF THE TEST

Two inherent limitations will restrict our ability to judge the SPR on the basis of the test. The first is the shortness of the test and the small amount of oil that will be sold; these make it difficult to determine how effective the DOE organization will be during an emergency that requires the sale of large quantities of oil over an extended period of time. The second is that the "non-emergency" conditions in the oil market are likely to make the behavior of buyers during the test
Aétral facing exercise.

Some of these changes would also enhance the value of the test as

with respect to the minimum bid and the amount of revenue generated.

price provision may appear to be interesting. This is true both

lower market price buyers are willing to offer for SPQ all, the

consider the three possible outcomes. If the minimum price is set

information to assess system performance.

to hinder one of the primary purposes of all testings: the generation of

price does nothing to enhance the realism of the test. Instead it lends

minimum price provision during the test is uninteresting. A minimum

such as dropping provisions for lagged demands, encourage realism

A number of the changes made in the sales provisions for the test:

the time of delivery.

because they are uncertain about the spot prices that will prevail at

delivery system and to overcome the reluctance of some buyers to bid

acceleration of the delivery period, both to increase the stress on the

effect of buyers' likely greater selectivity during the rest, and the

cost quality during the test than during an emergency, to offset the

during a test; the provision of prices of mean more important than

picks are processed, to offset the effect of the mean number of bids

considered, for example, are the shortening of the period during which

the process of realism among the players that might have been

modified only if they offer the important interventions in a test, and

result conditions—such as selling procedures—should of course

LIMITATIONS DUE TO TEST DESIGN

In evaluating the test results, can be done about other limitations it is critical to keep them in mind:

test may be less important during emergency conditions. Although little

issues of quality that seem important to potential buyers in the

underrepresentation of their behavior during an emergency. For example,
However, the minimum price may also have discouraged some potential buyers from bidding, and the information that these unsuccessful bids would have contained is lost.

If the minimum price is set higher than what buyers are willing to offer, no bids will be made and the test sale will have to be considered a failure. The exercise will have to be aborted, and we will learn only that the costs of doing business with the SPR exceed the maximum discount that was offered. No further data would be forthcoming.

The most unfortunate outcome would be a minimum price about equal to the price that some firms are willing to offer. Here, the minimum price would have a strong signaling effect, telling the firms what price they must offer to be considered for an award. The result would be a series of tie bids, which would turn the allocation of SPR oil into a lottery.\(^3\) The points made above concerning the loss of information that would have been contained in unsuccessful bids, if no minimum price had been in force, also apply in this case.

None of these problems associated with a minimum price in the test will be resolved if the minimum price remains unannounced, a possibility that has been discussed within DOE. It must be pointed out that the minimum price provision, and even the method by which it ought to be set, are required by enabling legislation. Private buyers will therefore be aware of the existence of the minimum price and will furthermore have a very good guess as to its exact value. All that will be achieved by keeping the minimum price "secret" is the creation of unnecessary confusion. Some firms will attempt to secure advance information of exactly how high the "secret" minimum price has been set; and, after the awards are made and the minimum price is announced, arguments will begin over whether it had been set correctly, and whether the winning bidder had access to inside information.

\(^3\)The SSPs provide for random allocation of oil to tie bids.
INFORMATION FROM SOURCES OTHER THAN THE TEST

Given what we believe are serious limitations in the proposed test, additional efforts should be made to use the occasion of the test to understand better the motivations of buyers to purchase SPR oil in an emergency, and to change, where appropriate, standard sales provisions and operating practices to make SPR oil a more valuable resource. On the basis of our interviews and analysis, we have come to some preliminary conclusions. For example, we believe that the following changes to the SSPs might be considered: (1) pre-qualifying at least some potential bidders, in order to accelerate the bid evaluation process; (2) accepting bids in terms of premiums above or discounts below the prevailing spot price on the date of delivery; (3) making available substantially more information about the characteristics of SPR oil than is presently the case.

None of these suggestions are new. Ways of improving the SSPs have been discussed and will be discussed as long as the SPR remains an integral part of energy emergency planning. However, the proposed test offers a unique opportunity for gathering quantitative information that may help inform that debate. This is why we view those aspects of the test design that tend to reduce the information that may be generated, such as the minimum price provisions, as particularly serious flaws.

To help offset some of these shortcomings, we propose a survey to be administered simultaneously with the test to all the recipients of the Notice of Sale, that would capture some of the information that the test alone cannot provide. The test would inspire firms to consider some of the questions associated with their role vis-a-vis the SPR, and the survey would enable them to communicate their reactions and concerns. A draft survey instrument with sample questions is provided in Appendix B.

To invite candor, we would suggest that the survey be confidential and that the individual responses be withheld from DOE. Some firms we contacted have openly voiced concern about bidding on SPR oil for fear

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that might make them "targets" for close GAO scrutiny. A confidential survey, administered by an institution not associated with the government, would not give rise to similar concerns, and might elicit some information that could otherwise not be obtained.

It is also likely that firms that decide against submitting a bid, because they consider their chances of winning the bid too small to justify the expense of obtaining bid bonds and the like, would still respond to the survey. Even a relatively low response rate will almost certainly generate more information than will be contained in the bids actually submitted. Furthermore, a survey offers the opportunity to ask hypothetical questions that can help pinpoint the extent to which specific provisions of the SSPs concern individual firms.

We do not view such a survey as an alternative, but rather as a complement, to the usual ways in which DOE solicits industry comments. It is an open secret that trade associations do not always speak with the same authority for all of their members. In an industry as diverse as the oil industry in the United States, it is virtually impossible that either the American Petroleum Institute or the National Petroleum Council completely represents the views of all its constituents.\textsuperscript{5} The proposed survey might provide an opportunity for soliciting some alternative views and help identify how the different aspects of the SPR system affect the different participants in the oil markets.

FURTHER WORK TO BE DONE

We must emphasize again that this evaluation plan is based on provisional draft documents (Draft Test Plan, Interim Draft of Distribution Management Manual) and that any changes in either may lead to modifications of the evaluation plan. Some changes may be mandated by the enabling legislation, which is, as of the writing of this Note, still in draft form. Once Congress has approved the necessary legislation to conduct the test, and once the final test plan has been drawn up and documented, the final evaluation plan can be drawn up as well.

\textsuperscript{5}Some potential buyers of SPR crude are not even represented in either of these two bodies.
A new version of the Distribution Management Manual is expected sometime in 1985. At that time it may be feasible to begin defining in more detail the individual tasks that are to be evaluated (see Section III). If DOE should decide to pursue the idea of a survey further, work on the survey instrument and sampling design might also begin fairly soon. Most of the other activities are best postponed until the proposed test is defined in somewhat more detail and a date for it has been set.
APPENDIX

A:

The Evaluation Worksheet

The SPR emergency response system is in a constant state of flux. Tasks are being modified, added, and deleted. It would therefore serve no purpose to develop a detailed evaluation worksheet, based on individual tasks, at this time. The worksheet given in Table A.1 is intended solely as an example and the tasks listed therein are hypothetical.\(^1\) Once a date for the test sale is fixed, the then current Response Functional Flow Diagram can serve as a source for identifying individual tasks to be evaluated.

It is useful to divide tasks into subtasks as far as possible. Small tasks are not necessarily easier to evaluate, but they allow better localization of potential problems. This can be a great help in finding ways of improving the emergency response system and preparing for an emergency drawdown.

B:

Draft Questionnaire for Bidder Survey

This Appendix presents a draft of the survey instrument that could be used to solicit some of the information that the proposed drawdown test otherwise cannot produce. This kind of information is essential for a complete evaluation of the SPR system, and of the test drawdown and sale of SPR oil. The survey would be distributed to all recipients of the Notice of Sale, whether they were on the current bidder's list or whether they requested the Notice separately, at the time of the test sale. It would be collected after the test sale was completed.

This questionnaire is a draft. The questions listed should be interpreted as examples, and may have to be changed and expanded considerably once the final test plan is determined.

\(^1\)An additional column for comments and notes, not shown in the table, should also be included.
<table>
<thead>
<tr>
<th>Task No.</th>
<th>Time Taken</th>
<th>Time Alloc</th>
<th>Sched</th>
<th>Marg</th>
<th>Done</th>
<th>Adj/ Hour</th>
<th>Raw Score</th>
<th>Index of WL</th>
<th>Adj Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
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<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>XYZ</td>
<td>Enter bid data into computer</td>
<td>12.30</td>
<td>5.40</td>
<td>24 hr</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>1.4</td>
<td>0.6</td>
</tr>
<tr>
<td>XZZ</td>
<td>Produce first ranking of bids</td>
<td>6.05</td>
<td>11.50</td>
<td>6 hr</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>1.04</td>
<td>0.8</td>
</tr>
<tr>
<td>XXZ</td>
<td>Receive oil at terminal</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>16.30</td>
<td>+1 hr</td>
<td>19.00</td>
<td>0.95</td>
<td>0.3</td>
</tr>
<tr>
<td>XXY</td>
<td>Barge arrives at berth</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>8.00</td>
<td>+0.5 hr</td>
<td>5.30</td>
<td>0.70</td>
<td>1.0</td>
</tr>
<tr>
<td>...</td>
<td>Etc. ....</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
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<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>
DRAFT QUESTIONNAIRE

1. Which of the following best describes your firm?
   Integrated oil producer, refiner, and marketer
   Major refiner
   Small refiner
   Oil trader
   Other (please specify) __________________________

2. If you are a refiner, what is your total daily refining capacity
   In your largest plant in the US __________
   In your second largest plant in the US __________
   In your third largest plant in the US __________
   In your fourth largest plant in the US __________
   Overall in the US __________
   Worldwide __________
   (US includes the US possessions such as the Virgin Islands)

3. If you are a refiner, are any of your refineries located
   On the Gulf Coast, served by a local pipeline from one of the
   SPR terminals
   Elsewhere on the Gulf Coast
   On the East Coast
   On the West Coast
   In a location served by Capline
   In a US Posession in the Caribbean
   Elsewhere in the US
   Elsewhere in the Caribbean

4. If you are a refiner, do you plan to refine the SPR oil yourself,
   should your bid be successful?

5. If you are not a refiner, or if you are a refiner but do not plan
   to refine the SPR oil yourself, have you made arrangements in advance
   for the sale or trade of the SPR oil, should your bid be successful?

6. Are you a supplier to the SPR?

7. If you entered a bid in the SPR test sale, what bid did you make?
   Delivery line item XXX: Price $____.____/bbl Quantity:____bbls
   Delivery line item YYY: Price $____.____/bbl Quantity:____bbls
   etc.
8. If you did not enter a bid, which ones of the above line items would you have bid on, and how much would you have bid if:

No minimum price was required:

Delivery line item __: Price $___/bbl Quantity:____bbls
Delivery line item __: Price $___/bbl Quantity:____bbls
Delivery line item __: Price $___/bbl Quantity:____bbls

There was no Jones Act requirement:

Delivery line item __: Price $___/bbl Quantity:____bbls
Delivery line item __: Price $___/bbl Quantity:____bbls
Delivery line item __: Price $___/bbl Quantity:____bbls

The SPR oil could be exported:

Delivery line item __: Price $___/bbl Quantity:____bbls
Delivery line item __: Price $___/bbl Quantity:____bbls
Delivery line item __: Price $___/bbl Quantity:____bbls

etc.

9. Rate the following as factors that either discouraged your making a bid or significantly reduced the bid you actually made:

Timing of Test

Very Important  Important  Not Important

Quantity of Oil sold

Quality Concerns:
  Leached Caverns
  Metals Content
  Organic Chloride
  Other ______

Technical Concerns:
  Capacity of Pipelines
  Capacity of Pumps
  Instrumentation
  Other ______

Expected SPR Performance:
  Delivery Delays
  Quality Monitoring
  Quantity Monitoring
  Billing Disputes
  Other ______
Bid Bond Requirements

Payment Terms

Fixed Price Bidding

Length of Time between
Bid and Award

Jones Act

Demurrage Clauses

etc.

10. How would you rate the same factors as influencing your bid during an emergency:

(see Question 9.)

11. What information on the quality of SPR oil, in addition to the data already published (see for example Federal Register, January 20, 1984), would you consider Essential: ___________________________

Useful: ___________________________

12. What other information on the SPR would you consider useful.

13. Now that this test has been conducted, is your opinion of the SPR Much Improved | Improved | Unchanged | Lowered | Much Lowered

Comments: ___________________________

14. Would you consider repeated tests of this kind useful?

15. Please list any recommendations that you have for increasing the effectiveness of future tests of this kind.

16. Please list any recommendations that you have for increasing the effectiveness of the SPR Drawdown System in general.
BIBLIOGRAPHY


