DISCLAIMER

This document has been approved for distribution to the public. All information classified by the Department of Energy Strategic Petroleum Reserve as Sensitive Unclassified Information has been removed from this document.

DOE/SPR/EA-1505

Environmental Assessment for the Proposed Increase in the Facility Capacity and Petroleum Inventory at the Strategic Petroleum Reserve's Bryan Mound Storage Facility, *********, ********** *******, Texas

U.S. Department of Energy

Strategic Petroleum Reserve

900 Commerce Road East

New Orleans, Louisiana 70123

November 2004

FINDING OF NO SIGNIFICANT IMPACT
PROPOSED INCREASE IN THE FACILITY CAPACITY AND PETROLEUM INVENTORY AT THE STRATEGIC PETROLEUM RESERVE'S BRYAN MOUND STORAGE FACILITY

AGENCY: Department of Energy

ACTION: Finding of No Significant Impact

SUMMARY: The U.S. Department of Energy (DOE) Strategic Petroleum Reserve (SPR) prepared an Environmental Assessment (EA) (Attachment A) in response to a proposal to increase storage capacity at the Bryan Mound (BM) storage facility (facility) located in *******, Texas by including existing cavern ullage of 3.5 million cubic meters (m^3) [22 million barrels (MMB)]. The EA has been prepared in accordance with the Code of Federal Regulations (CFR), 40 CFR 1500-1508 and 10 CFR 1021. It identified that the proposed action to increase storage capacity at the BM facility to ** million m^3 (*** MMB) by including existing cavern ullage of 3.5 million m^3 (22 MMB) has potential direct, indirect or secondary, and cumulative impacts associated with its implementation.

Based on the results of the EA and implementation of mitigation activities, DOE has determined that the proposed action may result in short-term, direct environmental impacts to air quality [e.g., volatile organic compound (VOC) emissions], non-hazardous waste generation, and noise generation, and potential long-term or permanent direct impacts to facility permits. Additionally, short-term, secondary impacts to air quality and laboratory waste generation were also identified as were cumulative impacts (as associated with the return of cavern 112 to service at its full capacity). However, as the EA indicates, there would not be a net increase in long-term, permanent/direct, indirect/secondary or cumulative impacts to the environment as a result of the implementation of the proposed action as most impacts to the environment are short-term; other potential impacts are predicated only on the occurrence of a facility accident, should one occur.

In summary, while a number of impacts were identified, the proposed action is not a major Federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act (NEPA). An Environmental Impact Statement (EIS) is not necessary and DOE is issuing this Finding of No Significant Impact (FONSI). DOE will also initiate and report on mitigation activities in accordance with the Mitigation Action Plan (MAP) contained in Attachment B to lessen the primary environmental impact associated with the proposed action, potential air impacts.

PUBLIC AVAILABILITY: The EA, FONSI, and MAP may be reviewed at www.spr.doe.gov/Environmental Safety and Health. Copies of the documents may be obtained from:

U.S. Department of Energy
Strategic Petroleum Reserve Project Office
Reading Room/Library DOE
900 Commerce Road, East
New Orleans, Louisiana 70123
Contact: Deanna Harvey
Phone: (504) 734-4316
email: deanna.harvey@doe.spr.gov

FOR FURTHER INFORMATION: Contact Katherine Batiste, NEPA Compliance Officer
Environmental, Safety, Health and Quality Division
U. S. Department of Energy
Strategic Petroleum Reserve
Project Management Office
900 Commerce Road East
New Orleans, LA 70123
katherine.batiste@spr.doe.gov
504-734-4400

DESCRIPTION OF THE PROPOSED ACTION: The DOE proposes that the authorized capacity of the BM facility and, upon Administration authorization, the petroleum inventory be increased by 3.5 million m^3 (22 MMB). The proposed action may be subdivided into two distinct actions, the action to increase the facility capacity and the action to increase the facility's petroleum inventory, which is conditioned upon future authorization by the Administration. A portion of the proposed increase in facility capacity would be obtained via modification of the existing internal cavern infrastructure. Specifically, of the proposed increase in cavern capacity, up to 1.4 million m^3 (8.8 MMB) would result from adjustment of the suspended casing of 10 caverns, thereby increasing the working cavern volumes without changing the cavern dimensions. The balance of the proposed increase to facility capacity, 2.1 million m^3 (13.2 MMB), would result from administrative activities including the return of cavern 112 to service at its full capacity [approximately *** million m^3 (** MMB)] and volume upgrades of at least 0.19 million m^3 (1.2 MMB) based on new information obtained during sonar investigation of caverns.

ALTERNATIVES: Under the no action alternative, the BM facility would continue to operate as it is currently configured. No actions to increase facility capacity or increase oil inventory would be performed.

ENVIRONMENTAL IMPACTS: Short-term, direct environmental impacts to air quality (e.g., VOC emissions), non-hazardous waste generation, and noise generation have been identified as associated with the implementation phase of the proposed action. Potential long-term or permanent direct impacts to facility permits have also been identified. Short-term, secondary impacts to air quality and laboratory waste generation were also identified as associated with the implementation phase of the proposed action as were cumulative impacts, which are associated with the return to cavern 112 to service at its full capacity. However, as the EA indicates, there would not be a net increase in long-term, permanent/direct, indirect/secondary or cumulative impacts to the environment as a result of the implementation of the proposed action as most impacts to the environment are short-term and/or predicated on the potential occurrence of a facility accident. Accident analyses conducted indicate that potential risks associated with implementation of the proposed action are not imminently dangerous to human health or the environment.

MITIGATION: Mitigation activities for the proposed action are twofold. In the field, these activities will likely be comprised of a closed containment system that routes oil displaced during cavern workovers to the BM site crude oil tanks, mitigating VOC emissions by preventing exposure of VOC emissions to the environment during workover activities. However, should such a system not be feasible, the option of a vapor recovery system likely coupled with a flare and connected to the fractionation (frac) tanks has been evaluated for use during workovers and may be implemented. Administratively, scheduling of specific activities will also be employed to reduce impact to air quality from VOC emissions.

The closed containment system that was ultimately chosen as the preferred method to mitigate VOC emissions is comprised of utilization of a centrifugal pump to transfer the oil displaced during depressurization to the BM site crude oil tanks. This temporary pumping system will pump oil into the normal site oil fluid transfer headers, which will be used to route oil into the BM site oil tanks. Based on total displacement of approximately 75,000 barrels of oil during implementation of the proposed action, additional VOC emissions from the BM site oil tanks are estimated to be minimal, approximately 0.36 metric tons (mtons) (0.4 tons), due to the cooling of the oil as it enters the tank. If tank lineup is not available, the same closed system with centrifugal pumps in series and a positive displacement pump will still be utilized. However, this temporary pumping system will pump oil into the same site oil transfer headers, which will then route oil directly to another cavern. No emissions are anticipated to result from this option.

The flaring system that is indicated as the currently preferred alternate method to mitigate VOC emissions is comprised of a trailer-mounted flare that can handle five to eight million standard cubic feet per day with 98% VOC destruction. The estimated VOC emissions per workover by cavern when mitigation activities comprised of a vapor recovery system coupled with use of a flare are initiated are approximately 0.07 metric tons (0.08 tons).

As stated previously, scheduling will also be employed to mitigate the impacts to air quality as a result of VOC emissions. The permitted emissions for the BM facility are based on the calendar year. Thus, activities associated with the proposed action may be scheduled to occur over more than one calendar year to diminish annual impacts while conforming to the proposed project schedule. The logistics and scheduling of the distinct activities of the proposed action, i.e. workovers and fill, will be coordinated with environmental personnel in New Orleans and at the site to ensure that there is the requisite awareness of air quality and permit limitations relative to the VOC emissions.

DETERMINATION: Based on the results of the EA and implementation of the mitigation activities as described in this FONSI and the MAP, DOE has determined that the proposed increase in the facility capacity and petroleum inventory at the BM facility does not constitute a major Federal action that would significantly affect the quality of the human environment within the context of NEPA. Preparation of an EIS is not required.

Issued at New Orleans, Louisiana, this 24th day of November, 2004.

William C. Gibson, Project Manager
U.S. Department of Energy
Strategic Petroleum Reserve

ATTACHMENT A
ENVIRONMENTAL ASSESSMENT

DOE/SPR/EA-1505

Environmental Assessment for the Proposed Increase in the Facility Capacity and Petroleum Inventory at the Strategic Petroleum Reserve's Bryan Mound Storage Facility, ********, **********, Texas

U.S. Department of Energy

Strategic Petroleum Reserve

900 Commerce Road East

New Orleans, Louisiana 70123

November 2004

Cover Sheet

Proposed Action: Expansion of the Bryan Mound Storage Facility to 254 Million Barrels

Type of Statement: Environmental Assessment

Lead Agency: Department of Energy, Strategic Petroleum Reserve Project Management Office

For Further Information:

Contact Katherine Batiste, NEPA Compliance Officer
Environmental, Safety, Health and Quality Division
U. S. Department of Energy
Strategic Petroleum Reserve
Project Management Office
900 Commerce Road East
New Orleans, LA 70123
katherine.batiste@spr.doe.gov
504-734-4400

Abstract:

The U.S. Department of Energy (DOE) Strategic Petroleum Reserve (SPR) prepared this Environmental Assessment (EA) in response to a proposal to increase storage capacity at the Bryan Mound (BM) storage facility (facility) located in ******** , Texas, by including existing cavern ullage of 3.5 million cubic meters (m^3) [22 million barrels (MMB)]. The EA has been prepared in accordance with the Code of Federal Regulations (CFR), 40 CFR 1500 - 1508 and 10 CFR 1021. This EA identified that the proposed action to increase the storage capacity of the BM facility to ** million m^3 (*** MMB) by including existing cavern ullage of 3.5 million m^3 (22 MMB) has potential direct, indirect or secondary, and cumulative impacts associated with its implementation.

Short-term, direct environmental impacts to air quality (e.g., VOC emissions), non-hazardous waste generation, and noise generation have been identified as have potential long-term or permanent direct impacts to facility permits. Short-term, secondary impacts to air quality and laboratory waste generation were also identified as were cumulative impacts (as associated with the return of cavern 112 to service at its full capacity). However, as the EA indicates, there would not be a net increase in long-term, permanent/direct, indirect/secondary or cumulative impacts to the environment as a result of the implementation of the proposed action as most impacts to the environment are short-term; other potential impacts are predicated on the occurrence of a facility accident.

In summary, while a number of impacts were identified, the impacts are minor relative to the overall ongoing BM facility activities and do not represent a significant degradation to the environment. As well, mitigation activities are proposed to further lessen the primary environmental impact associated with the proposed action, potential air impacts.

How to Read This Environmental Assessment

This *Environmental Assessment for the Proposed Increase in the Facility Capacity and Petroleum Inventory at the Strategic Petroleum Reserve's Bryan Mound Storage Facility,* ********** ********** *County, Texas* has a cover sheet, an Executive Summary, an Acronyms and Terms section, and nine chapters with supporting appendices. The purpose of the cover sheet is to present a brief overview of the entire document and its characteristics. The purpose of the Executive Summary is to present a condensed discussion of the analyses and impacts related to the proposed action and the no action alternative, derived from the descriptions contained Chapters 2-6 and comments and responses. The purpose of the Acronyms and Terms section is to facilitate the review of this document by providing an easily accessible list of the technical terms and acronyms utilized in the EA. In developing the outline for this EA, DOE adapted the EIS outline suggested by the Council on Environmental Quality (40 CFR 1502.10).

Executive Summary

The U.S. Department of Energy (DOE) Strategic Petroleum Reserve (SPR) prepared this Environmental Assessment (EA) in response to a proposal to increase storage capacity at the Bryan Mound (BM) storage facility (facility), located in ********, Texas, by including existing cavern ullage of 3.5 million cubic meters (m^3) [22 million barrels (MMB)] and to increase the petroleum inventory of the BM facility by 3.5 million m^3 (22 MMB). The EA has been prepared in accordance with the Code of Federal Regulations (CFR), 40 CFR 1500-1508 and 10 CFR 1021. This EA identified that the proposed action to increase storage capacity at the BM facility to ** million m^3 (*** MMB) by including existing cavern ullage of 3.5 million m^3 (22 MMB) has potential direct, indirect or secondary, and cumulative impacts associated with its implementation.

Purpose and Need For the Proposed Action

Consistent with this original maximum storage capacity designation and EPCA, the DOE is proposing activities to increase storage capacity at the BM facility by including existing cavern ullage of 3.5 million m^3 (22 MMB) and increase petroleum inventory at the BM facility by 3.5 million m^3 (22 MMB). This increased oil storage capacity is necessary to enable SPR to:

- Meet its EPCA authorized reserve capacity;
- Assist the U.S. in meeting its obligations under the International Energy Agency program to maintain emergency oil stocks;
- Offset the nation's increasing dependence on foreign oil imports in an unpredictable and often unstable international petroleum market; and
- Provide the nation with protected oil supplies that are less susceptible to manmade hazards such as terrorist activities.

Description of the Proposed Action and Alternatives

Under the proposed action, the DOE authorized capacity of the facility and, upon Administration authorization, the facility inventory will be increased by 3.5 million m^3 (22 MMB). The proposed action may be subdivided into two distinct actions, the action to increase the facility capacity and the action to increase the facility's petroleum inventory, which is conditioned upon future authorization by the Administration. A portion of the proposed increase in facility capacity would be obtained via modification of the existing internal cavern infrastructure. Specifically, of the proposed increase in cavern capacity, up to 1.4 million m^3 (8.8 MMB) would result from adjustment of the suspended casing of 10 caverns, thereby increasing the working cavern volumes without changing the cavern dimensions. The balance of the proposed increase to facility capacity, 2.1 million m^3 (13.2 MMB), would result from administrative activities including the return of cavern 112 to service at its full capacity [approximately *** million m^3 (** MMB)] and volume upgrades of at least 0.19 million m^3 (1.2 MMB) based on new information obtained during sonar investigation of caverns.

Under the no action alternative, the BM facility would continue to operate as it is currently

configured. No actions to increase facility capacity or increase oil inventory would be performed. The no action alternative does allow the BM facility to continue operations at its current facility capacity and inventory.

Affected Environment

Potentially affected resources include air quality, noise, waste management, and permitting activities. As the BM facility is located within the Houston-Galveston-Brazoria severe non-attainment area for ozone, any potential impacts to air quality are of primary concern and consideration. Additionally, the workover operations contemplated by the proposed action would generate additional noise and waste on-site. Finally, as current facility permits may need to be modified and/or additional permits sought, permitting activities for the facility would be affected as well.

Environmental Impacts

Short-term, direct environmental impacts to air quality (e.g., VOC emissions), non-hazardous waste generation, and noise generation have been identified as associated with the implementation phase of the proposed action. Potential long-term or permanent direct impacts to facility permits have also been identified. Short-term, secondary impacts to air quality and laboratory waste generation were also identified as associated with the implementation phase of the proposed action as were cumulative impacts, which are associated with the return to cavern 112 to service at its full capacity. However, as the EA indicates, there would not be a net increase in long-term, permanent/direct, indirect/secondary or cumulative impacts to the environment as a result of the implementation of the proposed action as most impacts to the environment are short-term and/or predicated on the potential occurrence of a facility accident. Accident analyses conducted indicate that potential risks associated with implementation of the proposed action are not imminently dangerous to human health or the environment.

In summary, while a number of impacts were identified, these impacts are minor in relation to the overall ongoing BM facility activities and do not represent a significant degradation to the environment. As well, mitigation activities are proposed to further lessen the primary environmental impact associated with implementation of the proposed action, potential air impacts.

Table Of Contents

Appendices

Tables

Figures

Acronyms and Terms

bbls – barrels
bgs – below ground surface
BHF – bradenhead flange
BM – Bryan Mound
BOP – blowout preventer
BTU – British Thermal Unit
CAA – Clean Air Act
CEQ – Council on Environmental Quality
CESQG – conditionally-exempt small-quantity generator
CFR – Code of Federal Regulations
cm - centimeters
CO – carbon monoxide
COE – Corps of Engineers
dB – decibel
degas - degassification
DM – DynMcDermott Petroleum Operations Company
DOE – Department of Energy
EA – environmental assessment
ECN – Engineering Change Notice
ECP – Engineering Change Proposal
EFH – essential fish habitat
EIS – Environmental Impact Statement
EJ – environmental justice
EPA – Environmental Protection Agency
EPCA – Energy Policy and Conservation Act
facility – storage facility
frac tank – fractionation tank
ft – feet
GOM – Gulf of Mexico
GOR – gas to oil ratio
gpm – gallons per minute
H_2S – hydrogen sulfide
HCP – Hearing Conservation Program
HGB – Houston-Galveston-Brazoria
honey oil – wireline grease
ID – inside diameter
in - inches
kg – kilogram
LA – Louisiana
lb – pounds
Leq(24) – total daily exposure
m – meters
m^3 – cubic meters
mi – miles
minor source – minor source of air emissions
MMB – million barrels

mtons – metric tons
mTPY – metric tons per year
MW – molecular weight
NAAQS – National Ambient Air Quality Standards
NEPA – National Environmental Policy Act
NPDES – National Pollutant Discharge Elimination System
NOx – nitrogen oxides
O_3 - ozone
oil – crude oil
Pb - lead
PM_{10} – particulate matter less than 10 microns (size)
psi – pounds per square inch (absolute pressure)
psig - pounds per square inch (gauge pressure)
QA/QC – quality assurance/quality control
RCRA – Resource Conservation and Recovery Act
RCT – Railroad Commission of Texas
scf/bbl – standard cubic feet per barrel
SIP – state implementation plan
SO_2 – sulfur dioxide
SOP – standard operating procedure
SPR - Strategic Petroleum Reserve
Supplement Analysis - Supplement Analysis of Site-Specific and Programmatic Environmental Impact Statements: Operational and Engineering Modifications, Regulatory Review, and Socioeconomic Variation
SPRPMO – Strategic Petroleum Reserve Project Management Office
TAC – Texas Administrative Code
TCEQ – Texas Commission on Environmental Quality
TDH&PT – Texas Department of Highways and Public Transportation
the Channel – Brazos River Diversion Channel
TNRCC – Texas Natural Resources Conservation Commission
TPY – tons per year
TX – Texas
UIC – underground injection control
U.S. – United States
VOC(s) – volatile organic compounds
workovers – cavern/well workovers

1.0 Purpose and Need

This chapter describes the purpose and need for this environmental assessment (EA) and the proposed action to increase the facility capacity and petroleum inventory at the United States (U.S.) Department of Energy (DOE) Strategic Petroleum Reserve's (SPR) Bryan Mound (BM) storage facility (facility).

1.1 Introduction

In the *National Environmental Policy Act of 1969* (NEPA), Congress recognized that technological, social, and economic forces have a profound influence on the quality of the human environment. Thus, implementation of the NEPA requires Federal agencies to consider the environmental consequences of their proposed actions before decisions are made. In complying with the NEPA, the SPR procedure per the *SPRPMO NEPA Implementation Plan* (SPRPMO O 451.1B) is to follow the letter and spirit of NEPA and to comply fully with the Council on Environmental Quality's (CEQ's) regulations [40 Code of Federal Regulations (CFR) 1500-1508] and DOE's own NEPA implementing procedures (10 CFR 1021).

The purpose of this EA is to provide agency decision-makers with sufficient evidence and analysis to select between preparation of an environmental impact statement (EIS) or issuance of a Finding of No Significant Impact for the proposed action to increase the capacity and petroleum inventory at the BM facility (Figure 1-1). The objectives of this EA are to (1) describe the purpose and need for the SPR's action; (2) describe the proposed action and the no action alternative; (3) describe baseline environmental conditions at BM; and (4) analyze the potential direct, indirect, and cumulative impacts to the environment that result from implementation of the proposed action or the no action alternative. This EA will also provide information regarding mitigative actions, if necessary, to minimize or avoid adverse effects on the environment associated with the proposed action.

1.2 Background

The creation of the SPR was mandated by Congress through the Energy Policy and Conservation Act (EPCA) on December 22, 1975. The objective of the SPR is to provide the U.S. with crude oil (oil) should a supply disruption occur. Oil is currently stored by the SPR in salt dome caverns along the Louisiana (LA) and Texas (TX) Gulf Coast. There are four SPR facilities in LA and TX and a project management facility in LA. The proposed action will occur at the BM facility. A general description of the BM facility is provided below.

The BM facility is located in ********** , TX, on the ********** Diversion Channel (the Channel)[1]. It occupies 2.02 square kilometers (500 acres) and almost encompasses the entire BM salt dome[1]. The BM salt dome was selected as a storage site early in the SPR program due to the existing brine caverns that could be readily converted to oil storage and its location near the ********** Pipeline System[1]. Development of the facility was initiated in 1977 and operations commenced in 1979[1]. The facility has ** underground

solution-mined storage caverns with a combined storage capacity of **** million cubic meters (m^3) [*** million barrels (MMB)] of oil[1]. The facility has the capability to drawdown and deliver oil at **** million m^3 [********** barrels (bbls)] per day[1]. A site map has been provided as Figure 1-2.

1.3 Statement of the Purpose and Need for the Proposed Action

It is anticipated the SPR's *** million m^3 (*** MMB) capacity will be reached by 2005. Consistent with this original maximum storage capacity designation and EPCA, the DOE is proposing activities to increase storage capacity and, upon Administration authorization, to increase petroleum inventory at the BM facility by 3.5 million m^3 (22 MMB). This increase is necessary to enable SPR to meet its EPCA authorized reserve capacity and to assist the U.S. in meeting its obligations under the International Energy Agency program to maintain emergency oil stocks. Increased storage capacity is also required to offset the nation's increasing dependence on foreign oil imports in an unpredictable and often unstable international petroleum market. Additionally, the storage increase provides the nation with protected oil supplies that are less susceptible to man-made hazards such as terrorist activities.

1.4 Scope of This EA

Analysis of potential environmental and socioeconomic impacts will be conducted using the sliding-scale approach. Key to this EA is the focus of efforts and analysis on significant environmental issues and alternatives as well as discussion of impacts in proportion to their significance. Resources that are anticipated to remain unaffected are appropriately addressed with less detail, but still presented with an explanation for diminished or no consideration in the impacts analysis. Conversely, certain aspects of the proposed action have a greater potential for producing environmental impacts, e.g. air emissions/air quality. These aspects and affected resources are discussed in greater detail than those that have little potential for impact, e.g. socioeconomic resources, and are further analyzed in Chapter 4, Environmental Impacts.

1.5 Public Involvement

The SPR provided written notification of its intention to prepare this NEPA analysis to the parties listed in Chapter 7.0 on July 30, 2004. This notification included project information and provided the opportunity for parties to make scoping comments on this EA. Parties expressing their interest received individual responses, where appropriate. All parties were provided the draft EA for their review and comments on September 28, 2004. The time period for review was 15 days. Concerns and comments received by the close of the comment period were considered in preparation of the final EA. Additionally, the SPR provided responses to interested parties as presented in Appendix A. Also included in Appendix A are copies of the notification letter, the letter transmitting the draft EA to interested parties, and the response letters from interested parties.

2.0 Description of the Proposed Action and Alternatives

This chapter describes the proposed action to increase the facility capacity and petroleum inventory at the BM facility, any alternatives that were considered, but not further analyzed, and the no action alternative as required by 10 CFR 1021.321(c).

2.1 Proposed Action – Increase in the Facility Capacity and Petroleum Inventory at the SPR's BM Storage Facility

Under the proposed action, the DOE authorized capacity of the facility and, ultimately, the facility inventory will be increased by 3.5 million m^3 (22 MMB). The proposed action may be subdivided into two distinct actions, the action to increase the facility capacity and the action to increase the facility's petroleum inventory. A portion of the proposed increase in facility capacity would be obtained via modification of the existing internal cavern infrastructure. Figure 2-1 depicts the cavern infrastructure before implementation of the proposed action. Specifically, of the proposed increase in cavern capacity, up to 1.4 million m^3 (8.8 MMB) would result from adjustment of the hanging strings of 10 caverns (caverns 4, 5,105, 106, 108, 109, 110, 114, 115, and 116) via cavern workovers (workovers), thereby affecting the working cavern volumes without affecting the cavern dimensions. This adjustment encompasses the addition of well casing until such casing terminates approximately 15 feet (ft) above the cavern floor. Figure 2-2 depicts the anticipated cavern infrastructure after implementation of the proposed action. Under the proposed action, eleven workovers are required to achieve up to 8.8 MMB in additional facility capacity.

Workovers require the reduction of cavern pressure to 0 pounds per square inch (psi) at the wellhead. This is accomplished in two steps. First, the cavern pressure is lowered from approximately 700 psi to less than 30 psi using permanently installed pumping equipment to transfer oil from the cavern to be worked over to another cavern of the same crude type. No hydrocarbon vapors are released into the atmosphere during a cavern to cavern transfer because this is a closed process. Second, the cavern pressure is further lowered from approximately 30 psi to 0 psi and then maintained at 0 psi using a portable system of pumps and a fractionation tank (frac tank). During the second step of this continuous process of transferring oil from the cavern to be worked over to another cavern of the same crude type, a very small volume of hydrocarbon vapor is released into the atmosphere after it enters the frac tank. Based on the gas to oil ratio (GOR) of the oil contained in each cavern, emissions anticipated during implementation of the proposed action were calculated. The results of these calculations indicate that mitigation in the form of vapor control will be required to control emissions from the workovers. Most likely, the frac tanks utilized to capture discharged oil will be equipped with vapor recovery systems.

The balance of the proposed increase to facility capacity, 2.1 million m^3 (13.2 MMB), would result from administrative activities only and would not, therefore, be associated with estimated air emissions. These include the return of cavern 112 to service at its full capacity [approximately *** million m^3 (** MMB)] and volume upgrades of at least 0.19 million m^3 (1.2 MMB) based on new information obtained during sonar investigation of caverns 2, 113, 101, 102, 103, 104, 107, and 111.

The final action associated with implementation of the proposed action is the increase to facility inventory of 3.5 million m^3 (22 MMB) of oil. This final action will only commence upon the express authorization of the Administration. Injection of oil into the caverns requires the displacement of brine. Displaced brine generally contains oil that is assimilated due to the oil/brine interface within the cavern. This displaced brine with its retained oil is discharged to the brine tank in accordance with facility permits. Therefore, it is expected that implementation of this action will result in air emissions such that mitigation activities will be required. Figure 2-3 illustrates the locations of the caverns anticipated to be affected by implementation of the proposed action.

2.2 No Action Alternative

Under the no action alternative, the BM facility would continue to operate as it is currently configured. The SPR would not perform actions to increase facility capacity nor would oil inventory increase. This is not an alternative that meets the SPR's purpose and need for action. It also fails to allow BM to assist the SPR in meeting programmatic needs. However, the no action alternative does allow the BM facility to continue operations at its current facility capacity and inventory.

2.3 Alternatives Considered But Dismissed

One alternative to the proposed action that was initially considered, but ultimately dismissed from consideration, was the development of two new 1.75 million m^3 (11 MMB) caverns at the BM facility. High implementation costs and additional environmental impacts of development of cavern space, relative to those associated with the use of existing space, resulted in the classification of this alternative as infeasible. Although this alternative would allow the BM facility to assist the SPR in meeting its programmatic needs, greater environmental impacts would result. Therefore, this alternative is withdrawn from further consideration in this EA analysis.

3.0 Environmental Resources

This chapter describes only the environmental resources that may be affected as a result of implementing the proposed action to increase the facility capacity and petroleum inventory at the BM facility. Potentially affected resources are described using the sliding scale approach with more detail provided for those resources likely to be most affected. The following environmental resources were initially analyzed for potential impacts, but, due to the results of the preliminary assessment, have been eliminated from further consideration and analysis:

- Environmental Justice
- Floodplains and Wetlands
- Clean Air Act Conformity
- Protection of Children
- Essential Fish Habitat
- Prime Farmland
- Fish and Wildlife Coordination Act
- General Regional and Facility Environment (climate, land use, aesthetics)
- Archeological, Cultural, and Historic Resources
- Socioeconomics and Demographics
- Biological and Ecological Resources (vegetation, wildlife including threatened and endangered species, parks and scenic rivers)
- Terrestrial Resources (geology, hydrogeology, soils)
- Water Resources and Water Quality

A brief description of these resources, the preliminary assessment and the justification for their elimination from further consideration and analysis has been provided in Appendix B.

3.1 Potentially Affected Resources

Discussion of the affected environment and impacts thereto is limited to existing environmental information that directly relates to the scope of the proposed action and the no action alternative. These resource categories are carried through the environmental impacts analysis presented in Chapter 4.

3.1.1 Air Quality

Air quality (in general) is a measure of the amount and distribution of potentially harmful pollutants in ambient air. Congress passed the *Clean Air Act* (CAA) in 1970 to mandate that the U.S. Environmental Protection Agency (EPA) regulate those potentially harmful pollutants through the National Ambient Air Quality Standards (NAAQS) for pollutants of concern known as criteria pollutants. EPA has identified six criteria pollutants: carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen oxides (NO_x), ozone (O_3), lead (Pb), and particulate matter less than 10 microns (PM_{10})[2]. These pollutants are emitted primarily from combustion sources such as boilers, emergency generators, and motor vehicles[3].

Regional air quality is influenced by the quantity of air pollutants emitted to the atmosphere within the region, by the quantity of air pollutants transported into the region, and by local geography, meteorology, and climate. The EPA designates all areas of the U.S. having air quality better than the NAAQS as "attainment areas", areas of the U.S. having air quality worse than the NAAQS as "non-attainment areas", or areas where there is a lack of data from which the EPA can form a basis for attainment status as "unclassified" [3]. The severity or magnitude of the exceedance for the criteria pollutants is determined by the amount that ambient air quality measurements are above the NAAQS. Based on the 1990 CAA Amendments, ozone non-attainment areas are classified as marginal, moderate, serious, severe or extreme[4]. Similarly, CO and PM_{10} non-attainment areas are classified as moderate or serious[5].

EPA has denoted the ozone classification of the non-attainment status for the Houston-Galveston-Brazoria (HGB) area as "Severe," meaning that the concentration of ozone is above the Federal maximum allowed limits (NAAQS). The BM facility is located within this severe non-attainment area for ozone. The ozone problem in the HGB area is one of the most severe in the country[4]. In 2000, the 1-hour ozone standard was exceeded 44 times in the HGB area, more than anywhere else in the country[4]. In 2001, the number of exceedances in Houston for the 1-hour ozone standard was 30 days[4].

As a source of emissions within the HGB severe ozone non-attainment area, the BM facility operates under Texas Commission on Environmental Quality (TCEQ) permit 6176B, which was originally issued as a construction permit on July 20, 1979. The facility is permitted for the emission of five of the six aforementioned criteria pollutants, but remains a minor source of air emissions (minor source), which requires that any facility within a severe non-attainment area emit less than 22.68 metric tons per year (mTPY) [25 tons per year (TPY)] of any criteria pollutant. In 2002, a separate permit for emissions of these criteria pollutants was obtained for emissions from the impending degasification (degas) unit (Standard Permit 52962). (Refer to Table 3-1 for the permit limitations on the emission of criteria pollutants for both permits.)

As shown in Table 3-1, the BM facility including the degas unit is permitted for total volatile organic compound (VOC) emissions of 19.74 mTPY (21.76 TPY) for their combined operation. VOCs comprise the largest portion of facility emissions. The BM facility is a negligible emitter of the other criteria pollutants. As a result of the composition of facility emissions and the location of the BM facility within the HGB severe ozone non-attainment area, quarterly monitoring of fugitive emissions to ambient air has been performed for VOCs since 1983 and is required by the current permits.

VOC is a broad classification for carbon-based compounds that can become volatile in the air[6]. These are particularly important for the BM facility and the HGB severe ozone non-attainment area because many are precursors to ozone formation. Ozone is not usually emitted directly into the air, but is formed by a chemical reaction between NOx and VOC(s) in the presence of heat and sunlight that occurs at ground level in the Earth's lower atmosphere (also known as the troposphere)[7]. Thus, the EPA does not recognize VOCs as criteria pollutants, but has chosen them as indicators on which to monitor performance of ozone control strategies. Many of these involve VOC reductions[6].

The State of TX has primacy over the CAA in TX and primary responsibility for obtaining compliance with the ozone NAAQS set forth by the EPA and required by the CAA[8]. Compliance with NAAQS is the sole responsibility of the State of TX and strategies for achievement of compliance in non-attainment areas are set forth in the State Implementation Plan (SIP)[3]. In the HGB severe ozone non-attainment area, strategies to achieve the ozone NAAQS focus on reduction of emissions of NOx and VOCs from various sources. The TX SIP has especially focused its emission reduction strategy on point sources of NOx and VOCs such as the BM facility[8].

3.1.2 Noise

Sources of noise on site are those associated with the facility's operations. As the BM facility is an active industrial facility, there are man-made sources of noise on-site as well as off-site and natural sources of noise from the surrounding environment. Noise associated with facility operations activities was measured at all facilities in 2001[9]. Ambient noise on-site at BM was measured over a 24-hour period to be approximately 70.5 decibels (dB) for roving patrols across the site[9]. As shelters have been constructed over some pump pads at the facilities, noise in localized areas adjacent to these pump pads may now be greater than 70.5 dB.

Although the noise levels associated with workover activities were not measured at the BM facility, they were measured at the Bayou Choctaw facility for substantially similar workover activities[9]. The average noise associated with maintenance activities for workovers was measured to be approximately 91.5 dB over the duration of the activity[9]. However, spikes in noise may increase noise levels to approximately 100 dB at the source[9].

3.1.3 Waste Management

The Resource Conservation and Recovery Act (RCRA) regulates hazardous wastes from the instant the waste is generated until the waste is ultimately destroyed[1]. This "cradle to grave" authority includes hazardous waste generators, transporters, and disposal facilities[1]. Hazardous wastes generated on the SPR are managed in strict compliance with state and EPA hazardous waste requirements[1]. SPR TX facilities fall under the jurisdiction of the Railroad Commission of Texas (RCT), which has not yet received delegation for enforcement of RCRA[1]. Therefore, the SPR complies with both EPA and RCT regulations in TX[1].

The BM facility is currently operating as a conditionally-exempt small quantity generator (CESQG) of hazardous waste[1]. CESQGs may not generate more than 100 kilograms (kg) [200 pounds (lbs)] of hazardous wastes per month[1]. Also, a CESQG must not store more than 1,000 kg (2,200 lbs) of hazardous waste on-site[1]. The hazardous wastes generated at the BM facility consisted primarily of laboratory wastes and fluorescent bulbs[1]. In 2003, the BM facility only manifested hazardous waste to an offsite bulb recycler[1].

As all wastes at the BM facility are characterized and disposed in accordance with Federal and state waste regulations, the appropriate waste management strategy is based on the results of waste stream characterization[1]. Thus, SPR non-hazardous wastes associated with underground hydrocarbon storage activities are regulated under the corresponding state

programs for managing drilling fluids, produced waters, and other wastes associated with the exploration, development, production or storage of oil or natural gas[1]. As the waste generated during workovers may be characterized as non-hazardous waste, it is handled similarly[10]. Other non-hazardous wastes, such as office wastes, are managed in accordance with state solid waste programs[10]. It is important to note that hazardous wastes are not treated, stored, or disposed at the SPR facilities, that SPR facilities are not RCRA-permitted treatment, storage, and disposal facilities, and that SPR facilities are not identified on the National Priority Listing[10].

3.1.4 Permitting Activities

The BM facility is currently permitted for facility operations through an array of state and Federal agencies for a variety of media. Permits include, but are not limited to air emissions, water discharges, water use, injection of oil, and cavern capacity. A brief description of the permits potentially affected by the proposed action is provided below for completeness. Only those permits requiring permitting activities will be addressed further in Chapter 4.0. A listing of noteworthy permits for the BM facility is presented in Table 3-2.

The BM facility is currently permitted for 19.74 mTPY (21.76 TPY) of VOCs including the facility operations permit and the degas plant permit (TCEQ permit nos. 6176B and 52962). Table 3-1 presented the permit limitations for all criteria pollutants emitted from the facility. Water discharge permits set standards and monitoring requirements for the discharge of brine, wastewater, and stormwater for six outfalls from the facility [National Pollutant Discharge Elimination System (NPDES) permit TX0074012]. The water usage permit regulates the acre-ft of raw water that the facility is allowed to remove from the Channel during drawdown and for facility operations. The facility is permitted for use of 452 million m^3 per year (367,088 acre-ft per year) of water from the Channel at a rate of 155 m^3 per minute [40, 950 gallons per minute (gpm)] (TCEQ Permit No. 3681). The permit for injection of oil into underground caverns regulates the amount of oil that may be stored underground at the facility. Each cavern has been assigned an underground injection control (UIC) number for use in tracking of these storage facilities. As for overall facility capacity, the entire BM facility is permitted as field ********* under lease number ******** for 48 caverns/wells, which are distinguished by their individual UIC numbers.

4.0 Environmental Impacts

This Chapter evaluates the environmental impacts of the proposed action and the no action alternative. Discussion of the environmental impacts is limited to existing environmental information about potentially affected environmental resources that directly relates to the scope of the proposed action and the no action alternative. All potential impacts to those resources, including direct, secondary or indirect, and cumulative impacts are evaluated. Effects include ecological (such as the effects on natural resources and components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative (40 CFR 1508.8).

4.1 Direct Impacts

Direct impacts or effects are defined by the CEQ at 40 CFR 1508.8 as those effects "which are caused by the action and occur at the same time and place." Direct impacts may also include those effects "resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial" (40 CFR 1508.8).

4.1.1 Proposed Action

Once the proposed action has been subdivided into two actions, the action to increase the facility capacity and the action to increase the facility's petroleum inventory, it may be further subdivided for accurate assessment of environmental impacts. The action to increase the facility capacity can be subdivided into four distinct activities:

- Administrative activities associated with recognition of additional capacity within existing caverns;
- Administrative activities associated with return of existing cavern 112 to service at its full capacity;
- Workover activities associated with the creation of additional capacity within existing caverns; and
- Permitting activities.

The action to increase the facility's petroleum inventory can also be subdivided into two distinct activities, which are:

- Receipt of oil on-site and
- Injection of oil into caverns.

It is important to note that all activities associated with implementation of the proposed action have been reviewed relative to the SPR's Environmental Management System (EMS). Workover activities such as those proposed are comparable to the routine workover activities identified in the EMS. The review of the proposed workover activities has not identified any new aspects or impacts and does not impact SPR compliance with Executive Order 13148.

Moreover, it is also imperative to note that not all activities associated with the proposed action will result in direct environmental effects. Three of the activities associated with the action to increase the facility capacity do not result in any direct impacts to the environment. These are:

- Administrative activities associated with recognition of additional capacity within existing caverns,
- Administrative activities associated with return of existing cavern 112 to service at its full capacity, and
- Associated cavern permitting activities.

Workover activities associated with the action to increase the facility capacity involve a process that utilizes particular equipment, personnel, and procedures to achieve the modification of casing length that will result in the increase in the capacity of a cavern. A general description of this process has been appended to this document. Please refer to Appendix C for a description of the workover activity to be performed. It is anticipated that the direct impacts of this process will be VOC emissions, noise, waste generation, and air permitting activities.

Only one activity to increase the facility's petroleum inventory is anticipated to be associated with direct environmental impacts, injection of oil into caverns. Caverns are filled with brine during the cavern creation process. As oil is injected into the caverns, that volume of brine is displaced and must be discharged. Thus, direct impacts associated with the injection of oil into caverns will be VOC emissions from displaced brine and related permitting activities.

4.1.1.1 Air Quality

Total emissions associated with the proposed action are estimated to be 12.59 metric tons (mtons) (13.88 tons) of VOC emissions. Three sources of these emissions have been identified to result from the implementation of the proposed action. These are:

- Brine discharged to depressurize a cavern during the workover;
- Frac tank usage to maintain the pressure of a cavern during workovers; and
- Brine discharged due to injection of oil into caverns during fill activities.

The activity to increase the facility capacity is associated with emissions from brine discharged to the brine tank and oil discharged to frac tanks during workovers. It is estimated that 3.58 mtons (3.95 tons) of VOCs will be emitted from frac tanks during the workover of caverns to create up to 1.4 million m^3 (8.8 MMB) of additional facility capacity. Only 0.63 mtons (0.69 tons) of VOCs from the brine tank will be emitted during the workover of caverns to create up to 1.4 million m^3 (8.8 MMB) of additional facility capacity. The activity to increase the facility's petroleum inventory is estimated to emit 8.38 mtons (9.24 tons) of VOCs from brine displaced by and discharged due to the fill of the additional facility capacity with 3.5 million m^3 (22 MMB) of oil. The facility is currently only permitted for 19.74 mTPY (21.76 TPY) of VOC emissions for both facility operation and degas operations.

VOC emissions depend on the Gas to Oil Ratio (GOR) for a cavern. Refer to Table 4-1 for the estimated VOC emissions per workover by cavern, which are approximately 3.58 mtons (3.95 tons). It is also estimated that the duration of the workover activities associated with the increase in facility capacity would range from approximately 1 month to approximately 2

months assuming that workovers typically range from 3 to 6 days each, are conducted over the course of 10 hour work days, and caverns are addressed consecutively. VOC emissions would be variable and intermittent over the duration of each workover and implementation of the overall proposed action. The discharge of approximately 24,000 m^3 (150,000 bbls) of brine from each cavern is also associated with depressurization during workovers[11]. This brine is discharged to the brine tank and ultimately to the Gulf of Mexico as allowed by permit (NPDES TX0074012). Refer to Table 4-2 for the estimated VOC emissions from brine discharge, which are approximately 0.63 mtons (0.69 tons)[11] and anticipated to be variable and intermittent over the duration of each workover and implementation of the overall proposed action.

The final activity associated with the proposed action is the injection of oil into caverns. The injection rate into wells/ caverns at the BM facility is approximately ******* m^3 (****** bbls) per day[12]. Thus, the increase in BM petroleum inventory could be physically accomplished through continuous fill for ** days considering that the controlling factors for receipt of oil would be the availability of the oil and VOC emissions associated with brine discharge. Royalty In Kind deliveries have generally occurred at a rate of approximately ** million m^3 per year (** MMB per year)[12]. Still, physically and logistically, it would be more realistic to expect fill of the 3.5 million m^3 (22 MMB) capacity over one year at a rate ranging from *** million m^3 per month (*** MMB per month) to *** million m^3 per month (*** MMB per month) [12]. Please refer to Table 4-3 for the estimated VOC emissions from brine for the receipt of a 3.5 million m^3 (22 MMB) of oil on-site, which are approximately 8.38 mtons (9.24 tons). These emissions are also anticipated to be variable and intermittent over the duration of each receipt of oil and the implementation of the overall proposed action.

All effects of VOC emissions resulting from the implementation of the proposed action are expected to be short-term, intermittent and without any irreversible effects on air quality at the facility or within the BM region. The proposed action is limited temporally and spatially; therefore, the effects of increased emissions on the air quality would dissipate rapidly. Additionally, as the proposed action is comprised of multiple activities that are also limited temporally, spatially, and in scope, the source of emissions for any one activity is not anticipated to be constant. The increase in emissions is anticipated to be handled via permitting activities and mitigation activities. Please refer to Sections 4.1.1.4 and 5.2, respectively, for additional information regarding the specific permitting and mitigation activities proposed. The intermittent emissions and rapid dissipation of VOCs will quell the potential for any long-term, irreversible intermittent degradation in the air quality at the facility and/or regionally during implementation of the proposed action[13].

4.1.1.2 Noise

A survey of sensitive subpopulations such as residences and schools performed for the *Supplement Analysis*[14] determined that the facility is approximately 3,541 m [2.2 miles (mi)] from any of these. Conversely, there are industrial activities/facilities located approximately one mile from the BM facility and a public road located adjacent to the facility. To ensure that noise would not adversely affect any citizens utilizing the adjacent road or employees at nearby facilities, an assessment of the noise levels that are protective of hearing loss in all areas for daily exposure and the ambient noise levels associated with general facility operations and workover activities at the fence line was conducted.

Industrial areas include such facilities as manufacturing plants, distribution facilities and mining operations[15]. The total daily exposure [Leq(24)] is the sum of the sound energy from all daily exposure, including occupational exposures[15]. Where the noise exposure is intermittent as workover and other facility noise at BM are, a Leq(24) of 70 dB is identified as the maximum level for protection of hearing[15]. Residential areas include apartments, seasonal and year-round residences and mobile homes[15]. A quiet environment is necessary in both urban and rural residential areas to prevent activity interference[15]. Activity interference occurs when the level of noise within an area interferes with human activity such as sleeping, communication and concentration[15]. A quiet environment is also necessary in both urban and rural residential areas to prevent annoyance, which is a known human reaction of activity interference, and to permit the hearing mechanism to recuperate if it is exposed to higher levels of noise during other periods of the day, i.e. an eight-hour exposure of 75 dB or greater[15]. A Leq(24) of 70 dB is identified as protective of hearing in all environments[15].

As the ambient noise level associated with facility operations is only 70.5 dB on-site, ambient levels outside the fence line will be less than or equivalent to these. Therefore, noise levels from facility operations are equivalent to those that are protective of hearing and no further assessment is required. For conservatism, noise levels associated with workover activities were assessed at the fence line/property boundary that is closest to a cavern that will be affected by such activities during implementation of the proposed action. Cavern 109, which is approximately 54.9 m [180 ft] from the closest property boundary, was modeled using equations from the Industrial Noise Manual[16].

This analysis indicated that, at the property boundary, the noise during workover activity at Cavern 109 will be approximately 60 dB with spikes possible up to 70 dB. These levels are considered protective against hearing loss and less than the ambient levels found in large urban environments [typically 80-90 dB] [15]. Additionally, cavern 116, the cavern closest to the public access road, is over 366 m (1200 ft) from said road. So, noise levels that would be associated with implementation of the proposed action at cavern 116 (and the site in general) will not affect the use of the public road or travel by citizens.

Further, as substantially similar activities occur regularly as part of facility operations and maintenance, such activities will not adversely affect facility personnel because the facility operates under a Hearing Conservation Program (HCP) as outlined in the Accident Prevention Manual (Revised 1/9/2004)[17]. The HCP is intended to prevent employee hearing impairment and to protect employees from hazardous noise levels[17]. It identifies what constitutes hazardous noise levels and establishes requirements and responsibilities for implementing feasible engineering controls and administrative procedures to prevent and control high noise levels, such as noise exposure monitoring, audiometric testing, protective equipment, training, and recordkeeping[17]. A HCP will be implemented and administered for all areas in which an employee may be exposed to noise level at an 8-hour time-weighted average of 85 decibels or above, measured on the A-scale weighting (dBA) at "SLOW" response[17]. The workover procedure specifically accounts for noise by requiring hearing protection when noise exceeds 85 dBA as well as posting of warnings in areas of high noise such as in the well area[17].

All effects of noise resulting from the proposed action would be short-term, confined to the BM facility and without any irreversible effects on the quality of life at the facility. The

proposed action is limited temporally and spatially and, therefore, the effects of increased noise on the quality of life at the facility would cease upon conclusion of the implementation of the proposed action. Additionally, as the proposed action is comprised of multiple activities that are also limited in location, scope and time, the source of noise, being associated primarily with the workovers, will be limited to that portion of the facility within which the workover is being performed. It is not anticipated to be constant. Thus, portions of the BM facility will likely be unaffected during implementation of the proposed action. Further, the intermittent, localized nature of the source indicates that increases in noise pollution in the portion of the facility where a workover is occurring will be short-term. No impacts from noise are anticipated off-site as the level of noise at the fence line resulting from the proposed action is estimated to be protective of hearing.

4.1.1.3 Waste Management

Although receipt of oil is not associated with any direct impacts to waste management, workover activities such as those described in the proposed action generate various wastes and, therefore, will impact waste generation at the BM facility[10]. The principal waste produced as a result of workovers is wireline grease (honey oil)[10]. The honey oil is a non-hazardous material used to grease the lines that are inserted downhole[10]. During the process, the honey oil becomes contaminated with crude oil and may (or may not) exhibit hazardous characteristics such as low flash and/or contain toxic contaminants such as benzene[10]. Spent honey oil is tested and managed as used oil burned for energy recovery in accordance with state and Federal used oil standards[10]. Other incidental wastes generated during workover are landfilled. These wastes include standard municipal solid wastes and non-biodegradable absorbent pads used during clean-up[10]. It is anticipated that the volume of wastes generated during the proposed action would be managed similarly[10]. Any additional wastes generated as a result of mitigation activities and their anticipated characteristics and disposal are discussed in Section 5.2.

All effects of additional waste generation would be short-term, confined to the BM facility and without irreversible effects. Further, the intermittent, localized nature of the source indicates that any degradation in the quality of life at that portion of the facility will remain short-term and reversible during implementation of the proposed action. As the wastes generated are managed as non-hazardous or burned for energy recovery, no adverse impacts are anticipated as a result of waste management.

4.1.1.4 Permitting

The BM facility is currently permitted for air emissions, water discharges, cavern capacity, and other activities as required. Permitting activities are anticipated to occur over a short time period. However, it is anticipated that the results of some permit modifications may either be permanent or long-term. Water discharge permits would remain in force, unaffected by the proposed action. Cavern and air permitting activities would be required to accommodate the proposed action.

The workovers that DOE proposes will be performed in accordance with water, air, and RCT permit/lease requirements and will utilize existing facility infrastructure. As the caverns are

permitted for a specified maximum capacity, cavern permitting activities will be required to reflect the post-workover oil storage capacity of each cavern. DOE has requested that the RCT amend the existing, permitted maximum volume of oil to support the proposed increase in oil storage capacity at BM. (Refer to Figure 2-3 for the location of the affected caverns.) Authorization from RCT was received in the form of a Modified Permit to Create, Operate, and Maintain an Underground Hydrocarbon Storage Facility at Bryan Mound on October 27, 2004. The result of this permit modification will be long-term and the resources will be irretrievable as, once modification of the authorized capacity created or otherwise recognized has occurred, it is anticipated that such capacity will be utilized to store oil for the life of the BM facility.

The most significant permitting activity that will be required prior to implementation of the proposed action will be air permitting activities to increase allowable emissions of VOCs at the brine tank during fill activities and from frac tanks during workover activities. The brine tank is already permitted for nearly two tons more VOC than has been utilized recently. As such, VOC emissions from brine discharged during workovers would be handled within the facility's existing permit limitations. However, in order to accommodate VOC emissions associated with the use of frac tanks during workovers and brine discharged following injection of oil into the caverns, permitting activities will still, at a minimum, require application to the TCEQ for a "Permit By Rule" for the BM facility. Permitting activities will be limited to "permitting by rule" under 30 Texas Administrative Code (TAC) 106.262 and an increase in VOC emissions of 2.93 mTPY (3.23 TPY). This limitation is necessary for the BM facility to remain a minor source and would require that the proposed action occur on a 4.3 year schedule unless VOC emissions are also mitigated. (Refer to Section 5.2 for a discussion on proposed mitigation activities.)

Compliance with the facility's minor source status requires a 22.67 mTPY (24.99 TPY) VOC permit limitation for emission of VOCs. Hence, absent mitigation, the proposed project schedule of four years cannot be supported by merely conducting permitting activities. The need to combine mitigation activities with the permitting activities under 30 TAC 106.262 is discussed below[18].

If the proposed project schedule of approximately 4 years is assumed and the total VOC emissions associated with the proposed action, 12.59 mtons (13.88 tons), are evenly distributed annually, approximately 3.15 mtons (3.47 tons) of VOC would be emitted per year during implementation of the proposed action. As there are only 2.93 mTPY (3.23 TPY) of VOC emissions available to the BM facility as a minor source, an increase in actual VOC emissions of 3.15 mtons (3.47 tons) per year would result in violations of BM's minor source status and permit. Thus, without mitigation activities, permitting activities to utilize the additional 2.93 mTPY (3.23 TPY) of VOC emissions available to BM as a minor source would be insufficient to support the implementation of the proposed action in accordance with the proposed project schedule. More specifically, the BM facility could not implement the proposed action over four years and retain its minor source status even if an additional 2.93 mTPY (3.23 TPY) of VOC emissions was requested and granted under Texas's "permitting by rule" Program. Barring reclassification of the facility as a major source of air emissions and a Title V permitting action, the proposed action cannot be implemented on a four year schedule without implementation of mitigation activities as 0.22 mtons (0.24 tons) of VOC emissions would remain un-permitted each year.

Considering that a primary condition of the proposed action is that the BM facility remains a minor source and that the proposed action is a limited action (temporally, spatially and physically), the rigorous activity of Title V permitting and reclassification of the facility would be undesirable and unnecessary. Further, a cursory assessment of potential impacts associated with these actions indicates that, given the location of the facility in the HGB severe non-attainment area for ozone, impacts could be significant and would be contrary to the TX SIP, which is focused on reduction of VOC and NOx from point sources.

Thus, mitigation activities that would maintain a level of emissions compliant with the site's current status (as a minor source) coupled with permitting activities to increase VOC emission limitations by 2.93 mTPY (3.23 TPY) (available via 'Permit By Rule') are required to accomplish the proposed action in accordance with the proposed project schedule while maintaining the site's current status as a minor source as mentioned in Chapter 2.0. Refer to Section 5.2 for a detailed discussion of the proposed mitigation activities for emission of VOCs that will allow implementation of the proposed action on a four year schedule within the 'minor source' status condition. Moreover, the "Permit By Rule" would only be necessary for the duration of the proposed action. It will be canceled upon completion of the proposed action and the facility will be returned to its currently permitted status.

4.1.2 No Action Alternative

Under the no action alternative, the BM facility would continue to be used as it is currently configured. The SPR would not perform actions to expand facility capacity or oil inventory as the facility is currently filled to its authorized capacity.

4.1.2.1 Air Quality

There would be no change in air emissions or quality as a result of this alternative. The point source emissions as well as temporary and localized emissions from mobile sources, such as automobiles and construction vehicles, would remain unchanged.

4.1.2.2 Noise

There would be no change in noise or noise pollution as a result of this alternative. The current sources of noise associated with facility operations include workover noise as part of facility maintenance activities. Noise levels on-site and off-site would continue unchanged.

4.1.2.3 Waste Management

There would be no change in waste generation or waste management as a result of this alternative. The current sources of waste associated with facility operations include workover waste as part of facility maintenance activities. Waste generation and management would continue unchanged.

4.1.2.4 Permitting

There would be no change in permitting for the facility as a result of this alternative. The current permits associated with facility operations would remain in force and unchanged.

4.2 Secondary or Indirect Impacts

Indirect impacts or effects are defined by the CEQ in regulation 40 CFR 1508.8 as those effects "which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable." Indirect impacts may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. As well, indirect effects include those effects "resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial" (40 CFR 1508.8).

4.2.1 **Proposed Action**

The potential for secondary impacts associated with the proposed action were evaluated in accordance with 40 CFR 1508.8. Secondary impact evaluation for this project included all aspects for which direct impacts were analyzed. Ultimately, this analysis focused on the potential for the contribution of additional VOCs to the environment of ******** County to increase the severity of the ozone non-attainment in the HGB severe ozone non-attainment area and the potential for an increase in the laboratory waste as a result of oil receipts.

The 2.93 mtons (3.23 tons) increase in VOC emissions to the air that will result from implementation of the proposed action within BM's current 'minor source' status may indirectly contribute to ozone formation in the HGB severe ozone non-attainment area. The potential effects from an additional contribution of VOCs are reasonably foreseeable, but not measurable, as formation of ozone depends on several factors that are unrelated to the emission of VOCs from the BM facility and that are generally uncontrollable. It is anticipated that any indirect effects resulting from the additional emissions of VOCs will be short-term and reversible as the proposed action is temporally-limited and the VOCs are expected to dissipate rapidly. Further, TCEQ has determined that certain types of facilities or modifications thereto will not make a significant contribution of contaminants to the atmosphere of TX (30 TAC 106.1). Such pronouncement is pursuant to the TX Health and Safety Code, the TX CAA, 5 TAC §382.057 and 5 TAC §382.05196 (30 TAC 106.1). Based on the statutory language of 30 TAC 106.1, which sets forth the purpose for obtaining "Permits By Rule," it is likely that the contribution of an additional 2.93 mTPY (3.23 TPY) of VOCs to the air in TX will also not be considered as making a significant contribution of contaminants to the atmosphere of TX.

The potential increase in laboratory waste would also be an indirect or secondary effect of the action to increase the facility's petroleum inventory as more oil would be received on-site. Oil must be sampled and analyzed upon receipt on-site; so, the amount of waste generated in the on-site laboratory would increase as would laboratory waste generated by analyses

associated with additional oil receipts that are conducted by off-site contract laboratories. This waste, characterized as hazardous (D001 Flammable Liquid), will be managed and disposed in accordance with state and federal regulations. It is estimated that 288.7 lbs of laboratory waste will be generated as oil receipts are received to increase the petroleum inventory by 22 MMB at the BM facility. Refer to Table 4-4 for estimated laboratory waste generated as a result of the 22 MMB increase in oil at the BM facility.

4.2.2 No Action Alternative

Under the no action alternative, the BM facility would continue to be used as it is currently configured. The SPR would not perform actions to expand capacity and inventory would not increase as the facility is currently filled to its authorized capacity. There would be no change in facility operations as a result of this alternative. The current sources of air emissions, noise and waste associated with facility operations including workovers that occur as part of facility maintenance activities would continue unchanged. No indirect effects are anticipated.

4.3 Cumulative Impacts

Cumulative impacts or effects are defined by the CEQ in regulation at 40 CFR 1508.7 as those effects "which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

4.3.1 Proposed Action

The incremental addition of 3.5 million m^3 (22 MMB) to the previously authorized and evaluated capacity of the BM facility has the potential to add incremental risk to the transportation of oil to the facility, increase severity of a spill from cavern 112, which is currently under-utilized, and increase emissions at the terminal during a drawdown. The cumulative impacts associated with the transportation of oil to and from the facility and the severity of a spill from cavern 112 are assessed in detail under Section 5.1, Accident Analysis, as any effects from the aforementioned cumulative impacts would primarily be felt during such an accident/incident. The results of the assessment performed in Section 5.1 are briefly discussed below for completeness.

Relative to the transportation of oil to and from the facility, the risk/severity of a spill is calculated from the miles of pipeline and the net loss of oil per mile of pipeline. Thus, additional oil transported to the facility does not cumulatively impact such risk. (Refer to Section 5.1). For conservatism, however, an analysis of the impacts of an increase in facility capacity was performed. As the facility currently has an oil capacity of **** million m^3 (**** MMB), the transportation of an additional 3.5 million m^3 (22 MMB) of oil would result in an approximate increase in facility capacity of *** %. If an increase in spill risk/severity proportional to the increase in facility capacity is assumed (*** %), the net increase in loss of

oil in bbls would increase by approximately 0.25 m^3 (1.6 bbls). An increase in the estimated severity of a spill during the transportation of oil to the BM facility that is proportional to the percent increase in current site capacity would then result in an estimated spill volume of 2.93 m^3 (18.4 bbls) on an annual basis. Such an increase is negligible and conservative given the overall capacity of the facility and the impacts originally assessed[19,20,21] and that the SPR has, historically, achieved a release rate that is lower than the industry average.

Assuming a proportional increase in the actual incident spill severity for SPR pipelines, the net increase in loss of oil in barrels would be approximately 0.16 m^3 (1 bbls). An increase in the estimated severity of a spill during the transportation of oil to the BM facility that is proportional to the percent increase in current site capacity would then result in an estimated spill volume of 1.80 m^3 (11.3 bbls) on an annual basis. Such an increase is negligible.

While the potential oil displacement from a wellhead severance was evaluated in the BM EISs, it was done so using generic data and the cavern characteristics for a 10 MMB cavern. Thus, a cavern-specific analysis is performed for an accurate analysis of Cavern 112, which is a [redacted] MMB cavern. Relative to the severity of a spill from cavern 112, the cavern that is currently underutilized, the severity of a spill event is directly related to the compressibility of the stored liquid. As the brine currently stored is less compressible than the crude oil that will be stored in the cavern upon its return to service at its full capacity, the severity of a spill event is increased by approximately 66%. This increase in severity assumes that cavern is full with oil to its new authorized capacity when a total wellhead severance occurs. Such increase in risk, while substantial in relation to the active profile, is negligible given the overall capacity of the facility and the impacts for accident and spill events that were previously assessed in the BM EISs[19,20,21]. Specifically, the previous evaluation of spill events includes estimation of oil displacement for caverns such as Cavern 5, which is three times the size of Cavern 112[19].

Relative to any potential increase in emissions at the terminal during a drawdown, the severity of these additional emissions within the HGB severe ozone non-attainment area is evaluated in context with the circumstances during which a drawdown would be ordered and the operating limitations of the facility and the receiving terminals. In the event of the drawdown, the BM facility is limited to a set drawdown rate, which is limited by the design specifications of the distribution system for BM, e.g. the size of the pumps that pump oil off-site. Therefore, the daily emissions associated with drawdown will not be affected, but the overall duration of the drawdown will be lengthened. This increase in duration should not result in a net increase of emissions at the terminal as any increase will be offset by the absence of commercial transfers to and from the receiving terminal due to the oil shortage that triggered the drawdown of the SPR.

Additionally, mitigation to avoid excessive emissions has already been implemented at the BM facility. This includes use of heat exchangers to lower the temperature of the oil being drawn down, use of hydrogen sulfide (H_2S) scavengers to lower the concentration of H_2S in the oil being drawn down, and degasification of the oil prior to distribution. Any of these actions alone would ultimately reduce the level of emissions associated with the BM oil. Use of these in combination would counteract any increase in emissions at the receiving terminal such that impacts would be minor. Further, these mitigation activities evidence the SPR's commitment to operating in an environmentally responsible manner.

4.3.2 No Action Alternative

Under the no action alternative, the BM facility would continue to be used as it is currently configured. The SPR would not perform actions to expand capacity and oil inventory would not increase as the facility is currently filled to its authorized capacity. There would be no change in facility operations as a result of this alternative. The current sources of air emissions, noise and waste associated with facility operations including workovers that occur as part of facility maintenance activities would continue unchanged. The cumulative effects of the current facility operation have already been addressed in previous NEPA documentation[19,20,21].

5.0 Accident Analysis and Mitigation Activities

Documents prepared under NEPA should inform the decision maker and the public about the possibility that reasonably foreseeable accidents associated with proposed actions and alternatives could occur and what their potential adverse consequences could be. Accident analyses are necessary to facilitate informed, reasonable decision-making and appropriate consideration of mitigation measures. Analyses presented in this Chapter were performed in accordance with CEQ regulations (40 CFR 1502.22) and recent DOE guidance.

5.1 Accident Analysis

Candidate hazards for accident analysis include actions involving personal injury, electricity, explosive materials, pressurized systems, biohazards, radiation, hazardous chemicals, combustible materials, toxic gas leaks, and asphyxiants. These types of hazards are potentially included within site-wide accidents, such as initiated by natural phenomena, operational accidents, or transportation accidents. Hazards have the potential to affect the public or workers, depending on the type of accident that may occur.

The proposed action has three possible accident/hazard scenarios to be analyzed:

- Potential for accidents by workers during workovers anticipated by the proposed action;
- Potential for increased severity of spill during a total wellhead severance at cavern 112; and
- Potential for increased severity of a spill incident during transportation of an additional 3.5 million m^3 (22 MMB) of oil to the BM facility via existing pipelines.

Each potential accident and/or hazard was assessed relative to the most recent data available. Where site-specific data was available for analysis, it was utilized to enhance the accuracy of the accident analysis. Where site-specific data was not available, only comparable data for the most closely analogous accident and/or hazard was utilized.

5.1.1 Worker Accident Analysis For The Proposed Action

The analysis was conducted to determine the potential for accidents by workers associated with workover activities anticipated by the implementation of the proposed action. This analysis was conducted using data regarding recordable accidents logged from 12/1/01 to 11/30/03. During the aforementioned period, approximately 21 workovers and only one recordable accident during workover activities occurred. Thus, the accident rate associated with workovers is currently 0.0476 recordable accidents per workover. As eleven workovers will be performed during the proposed action, it is estimated that 0.52 accidents may occur during implementation of the proposed action.

5.1.2 Wellhead Severance Analysis For Cavern 112

This analysis was conducted to determine the potential for increased severity of a spill in the event of a total wellhead severance for Cavern 112, a ** MMB cavern, relative to the current active profile, which estimates the potential brine displacement in the event of a total wellhead severance. The original EISs that characterized the environmental impacts of the BM facility also evaluated the potential for oil to be displaced during a total wellhead severance[19,20,21]. The original EIS estimated the oil displacement for caverns up to 36 MMB onsite in the event of a wellhead failure[19]. Subsequent EISs based potential oil displacement in the event of a wellhead severance on generic cavern characteristics for 10 MMB caverns and generic compressibility data[20,21]. The *Seaway* EISs estimated that oil displacement from a generic 10 MMB cavern would be approximately 40,000 bbls[20,21]. Despite the protection offered by the containment of any oil spilled via dike containment, this EA analyzes cavern 112 at its proposed oil storage capacity of approximately ** MMB. Only cavern 112 is analyzed as it is the only cavern in which the proposed action will result in a significant change from the existing cavern characteristics.

Since cavern 112 has been out of service relative to its potential to store oil, its active spill event severity was based on its being filled with brine. It is anticipated that the introduction of approximately 1.9 million m^3 (** MMB) of oil will change the characteristics of the cavern from those assumed in the active profile (such as pressure rate), which would, in turn, affect the volume lost during a wellhead severance. At a pressure rate of 10.49 m^3 per psi (66 bbls per psi), it is expected that, once returned to service at its full capacity, cavern 112 would lose approximately 8,100 m^3 (50,664 bbls) of oil during a total well head severance. This is compared with the volume of 4,900 m^3 (30,553 bbls) of brine that is currently estimated to be lost during a total wellhead severance prior to the implementation of the proposed action. By basing the potential oil displacement on the specific characteristics of Cavern 112, it is determined that the potential displacement could be approximately 21% more oil than was originally estimated in the *Seaway* EISs as displaced oil from a total wellhead failure, but less than the oil displacement estimated for larger caverns such as Cavern 5. The potential oil displacement from cavern 112 is negligible when it is considered in the context of the potential oil displacement for the facility as a whole. Calculations and data have been provided in Appendix D.

5.1.3 Spill Severity Analysis For Transportation of Oil To BM

The analysis conducted to determine if the potential for a spill incident during transportation of an additional 3.5 million m^3 (22 MMB) of oil to the facility via existing pipelines was conducted utilizing the most recent industry average data [U.S. Department of Transportation (DOT) 12/31/2003 (Appendix E)] for hazardous liquid pipelines from the U.S. DOT, Office of Pipeline Safety, and data regarding the total mileage for pipelines from the terminals to the BM facility [SPR, 12/31/2003 (Appendix E)]. The analysis of spill severity was conducted because minor releases of crude oil from SPR pipelines have occurred previously and the potential for a release from SPR pipelines may be affected by terrorism and other hominal hazards and external causes.

The calculations and data regarding the estimated spill severity from a BM pipeline have been presented for review in Appendix E. Refer to that appendix for more detailed

information. Calculations to determine the potential bbls spilled during the transportation of oil to the BM facility were based on 2003 data. These calculations are based on the net loss of liquid in bbls per mile of pipeline and the total mileage of pipelines associated with transportation to and from the BM facility to and from the receiving terminals. The results indicated that a spill of approximately 2.67 m^3 (16.8 bbls) of oil was anticipated to occur during the transportation of oil to the BM facility on an annual basis. Neither the facility's current capacity nor the proposed increase affected the estimated spill severity during transportation of oil.

The potential for any increase to spill severity that may result from the proposed action was addressed for conservatism only as, historically, there have only been three off-site spills from BM SPR pipelines since 1992 with an incident spill severity of 1.64 m^3 (10.3 bbls). Annually, the spill severity for BM SPR pipelines is only 0.41 m^3 (2.6 bbls). The SPR spill rate and spill severity have been low due to the implementation of several programs to maintain the SPR pipelines. These programs include a pipeline pigging program, which requires that pipeline pigging occur every 3 years; a cathodic protection program, which requires bi-monthly and semi-annual inspections; and an internal corrosion control program, which requires continuous inspection as appropriate. Such programs reduce the potential for releases of oil to the environment as a result of pipeline integrity, but will not reduce the potential for a release from external sources.

5.2 Mitigation Activities

It is the intent of the DOE to conduct all activities associated with increasing facility capacity, i.e. workovers and permitting, and the facility's petroleum inventory, i.e. future fill, without altering the classification of the facility as a "minor source" of air emissions. Thus, based on classification as a minor source, actual emissions of VOCs resulting from all actions associated with the proposed action cannot exceed 2.93 mTPY (3.23 TPY). Preliminary calculations of VOC emissions indicate that emissions for the proposed action would exceed this. Thus, mitigation will be required during implementation of the proposed action.

There are many options for mitigation activities relative to air emissions. Mitigation activities considered and evaluated were:

- Vapor recovery coupled with the use of an activated carbon filter system;
- Use of a closed containment system to prevent exposure of VOCs to the environment (2 options, use of a bladder tank and de-pressuring via piping to the site tanks); and
- Vapor recovery coupled with the use of a flare.

Initially, vapor recovery coupled with the use of a flare was determined to be preferable on both an environmental and cost basis and was selected to be the primary mitigation activity. However, the use of a closed containment system by routing of oil to site floating roof tanks was determined to be feasible and, so, it became the preferred primary mitigation activity on both an environmental and cost basis.

Hence, it is most likely that the primary preferred mitigation activity will be comprised of the use of a closed containment system to route oil displaced during cavern workovers associated with the proposed action to the BM site oil tanks, mitigating VOC emissions by preventing VOC emissions from oil transferred during workover activities. However, in the

unlikely event that this preferred primary mitigation activity could not be utilized, the alternate preferred mitigation activity, vapor recovery coupled with use of a flare, would be considered and may become the primary mitigation activity. Additionally, scheduling of specific activities will also be employed to reduce impact to air quality from VOC emissions. All mitigation activities evaluated and considered are described in this section along with justification for their elimination from consideration, selection for use, or selection as a preferred alternative.

The activated carbon filter system that was considered would have eliminated VOC emissions or reduced them to levels that comply with the BM air permit(s). However, given the volume of oil flowing through the frac tanks during the implementation of the proposed action, the potential waste generated in the form of the VOC-contaminated filters was estimated and these estimations indicated that there would be indirect environmental impacts associated with use of vapor recovery coupled with an activated carbon filter system.

Waste generation calculations utilizing the worst case cavern-specific oil characteristics and carbon filter performance data provided by the vendor revealed that this mitigation of VOC emissions during implementation of the proposed action would generate approximately 27.57 mtons (30.39 tons) of the spent carbon filters. Table 5-1 presents the waste estimated to be generated throughout the implementation of the mitigation activities during the proposed action. The calculations in Table 5-1 are based on the worst case VOC emissions from BM Cavern 105, which is considered to be a gassy cavern. Gassy oil is defined as oil with a GOR greater than 0 scf/bbl. Table 5-2 presents the estimated unmitigated VOC emissions (speciated) that were expected to be captured by the vapor recovery system during one workover of a gassy cavern.

Such waste generation is substantial despite a returnable carbon filter program offered by the vendor that allows filters, upon return, to be processed such that the carbon will be re-activated for re-use[10]. Such a re-use would ultimately reduce the amount of waste disposed in association with mitigation activities during the implementation of the proposed action, but amounts of waste generated may still be substantial. In preparation for assessment of any potential effects associated with any remaining carbon material that would have to be disposed, the potential composition of the spent filters was analyzed to determine if it would exhibit any characteristics of hazardous waste. Preliminary data indicates that the spent carbon filters will not exhibit characteristics of hazardous waste and will not, therefore, be characterized as such, allowing any incidental, non-recyclable waste generated in association with mitigation activities to be handled as solid waste and landfilled accordingly. Still, such substantial waste generation and the associated costs discouraged use of vapor recovery with an activated carbon filter system as a mitigation activity for the proposed action.

The first closed containment system option that was considered would have eliminated VOC emissions to the environment. Specifically, this system involved the use of a bladder tank inside of a frac tank to contain all VOC emissions as the caverns are de-pressured. That this technology is unproven for this application indicated that it may represent unknown risks to worker health and safety as well as to releases to the environment. This potential for health and safety risks as well as environmental risks discouraged use of a closed tank containment system as a mitigation activity for the proposed action.

The second closed containment system option would reduce, but not eliminate VOC emissions to the environment. This system involves the use of site piping and tanks to de-

pressure the caverns. Oil that is displaced during de-pressuring would be routed to the site tanks, cooling as it flows underground and into the floating roof tanks. This process would lower the vapor pressure and eliminate the flashing of VOCs that accompanies flow into a frac tank.

This option was chosen as the preferred method to mitigate VOC emissions resulting from cavern workovers associated implementation of the proposed action as, in general, the overall characteristics of the closed containment system (as described below) make it a superior mitigation activity. Specifically, the use of the closed containment system requires only a minor modification to existing procedures and equipment, which greatly decreases the cost of implementation, while preventing VOC emissions from oil transfers during workovers. Since the only modification to the normal workover configuration is the use of a frac tank bypass line as the primary fluid movement route, this mitigation activity also presents no new environmental aspects and/or impacts.

Specifically, the closed containment system will utilize a centrifugal pump to transfer the oil displaced during depressurization to the BM site oil tanks. This temporary pumping system will pump oil into the normal site oil fluid transfer headers, which will be used to route oil into the BM site oil tanks. The addition of oil to the site floating roof tanks that will result from the eleven workovers associated with the implementation of the proposed action would increase total VOC emissions from the site tanks by only 0.36 mtons (0.4 tons). Refer to Table 5-3 for the estimated additional VOC emissions from the BM site oil tanks when mitigation activities comprised of a closed containment system are initiated.

If tank lineup is not available, the same closed system with centrifugal pumps in series and a positive displacement pump will be utilized. However, this temporary pumping system will pump oil into the same site oil transfer headers, which will then route oil directly to another cavern. No emissions are anticipated to result if this option is utilized. Both options of the closed containment system process will be covered by existing environmental and safety and health controls and represent only a minor modification to the existing workover configuration.

The flaring system that was considered was chosen as the preferred alternate method to mitigate VOC emissions resulting from cavern workovers associated with implementation of the proposed action. It is comprised of a trailer-mounted flare that can handle five to eight million standard cubic feet (scf)/day with 98% VOC destruction. Refer to Table 5-4 for the estimated VOC emissions per workover by cavern when mitigation activities comprised of a vapor recovery system coupled with use of a flare are initiated. These estimated VOC emissions are approximately 0.07 mtons (0.08 tons). Given the VOC destruction process utilized by a flaring system, NOx, CO and possibly SO_2 and PM_{10} production would be an indirect environmental impact of the flaring system. Refer to Table 5-5 for the estimated NOx and CO emissions per workover by cavern when mitigation activities comprised of a vapor recovery system coupled with use of a flare are initiated. The estimated NOx emissions are approximately 0.009 mtons (0.01 tons) while the estimated CO emissions are approximately 0.045 mtons (0.05 tons). PM_{10} emissions should be 0 tons due to the use of a smokeless flare in accordance with EPA regulations. SO_2 emissions are anticipated to be negligible. All emissions resulting from these mitigation activities would also have to be permitted and would likely be permitted via a "Permit By Rule." It is not anticipated that emissions of these criteria pollutants would affect the 'minor source' status of the BM facility.

The vapor recovery and flaring system anticipated will include the flare stack and associated support equipment, as necessary. The support equipment that has been identified thus far includes a non-sparking blower with diesel engine, a bi-directional API- and USCG-accepted detonation arrestor and a propane or natural gas pilot. Siting of the flare off the wellpad for the cavern being worked over is anticipated. As well, process safety devices that are anticipated include, at a minimum, a flame arrestor on the gas outlet of the frac tank and a nitrogen purge on the frac tank. A determination of potential hazards associated with the final design of the vapor recovery system coupled with the use of a flaring system will be required to ensure worker health and safety and minimize environmental risks. If selected as the preferred mitigation activity at a later date, the exact design specifications of the flaring system required to accomplish these objectives will be documented in the design review and subsequent operating procedures.

As stated previously, scheduling will also be employed to mitigate the impacts to air quality as a result of VOC emissions. The permitted emissions for the BM facility [mtpy (tpy)] are based on the calendar year. Thus, activities associated with the proposed action may be scheduled to occur over more than one calendar year to assist with remaining in compliance with the proposed project schedule of four years from commencement of activities. The logistics and scheduling of the distinct activities of the proposed action, i.e. workovers and fill, will be coordinated with environmental personnel to ensure that there is the requisite awareness of air quality and permit limitations for VOC emissions. Moreover, activities at the facility will be performed with similar awareness of the potential impacts to air quality and permit compliance issues in DOE's effort to reduce the environmental impacts of the proposed action and maintain compliance.

By combining scheduling and use of a closed containment system to direct transfer oil to the site oil tanks, DOE will, ultimately, be able to meet its proposed schedule while remaining a 'minor source' of air emissions *and* minimize the short term impacts anticipated to be associated with implementation of the proposed action.

6.0 Conclusions

This EA identified that the proposed action has potential direct, indirect or secondary and cumulative impacts associated with its implementation. Short-term, direct environmental impacts to air quality (e.g., VOC emissions), non-hazardous waste generation and noise generation have been identified as associated with the implementation phase of the proposed action. Potential long-term or permanent modifications to facility permits have also been identified.

Short-term, secondary impacts to air quality and laboratory waste generation were also identified as associated with the implementation phase of the proposed action as were cumulative impacts associated with the return to cavern 112 to service at its full capacity. However, as the EA indicates, there would not be a net increase in long-term, permanent/direct, indirect/secondary or cumulative impacts to the environment as a result of the implementation of the proposed action as most impacts to the environment are short-term and/or predicated on the occurrence of a facility accident. Accident analyses conducted indicate that risks associated with implementation of the proposed action, though existing, are not imminently dangerous to human health or the environment.

In summary, while a number of impacts were identified, these impacts are minor in relation to the overall ongoing BM facility activities and do not represent a significant degradation to the environment. As well, mitigation activities are proposed to further lessen the primary environmental impact associated with implementation of the proposed action, potential air impacts.

7.0 List of Agencies Notified/Consulted

The following list presents organizations that were consulted to obtain information used in the preparation of this Environmental Assessment.

- U.S. Army Corps of Engineers, Galveston District
- U.S. Fish and Wildlife Services
- Texas Parks and Wildlife Department, Wildlife Habitat Assessment Branch
- Texas General Land Office
- Texas Commission on Environmental Quality, Policy and Regulations Division
- Texas Governor’s Office, Environmental and Natural Resources
- Texas Governor's Office of Budget and Planning
- Railroad Commission of Texas
- U.S. Environmental Protection Agency, Region VI
- Texas Historical Commission

8.0 List of Preparers

Christina Villavaso Bigelow, DynMcDermott Petroleum Operations Company, Environmental Program Analyst, under the direction of:

- David Folse, DynMcDermott Petroleum Operations Company, Supervisor – ES&H Compliance,
- William Bozzo, DynMcDermott Petroleum Operations Company, Environmental Department Manager, and
- Kirkland Jones, DynMcDermott Petroleum Operations Company, Environmental, Safety and Health Director

9.0 References

1. 2003, U.S. Department of Energy, Strategic Petroleum Reserve, *Site Environmental Report*.
2. 2003, TCEQ, at http://www.tnrcc.state.tx.us/air/monops/naaqs.html.
3. 1995, Texas Environmental Center, *Texas Environmental Almanac Online*, http://www.texascenter.org/almanac/Air/AIRCH6P3.HTML#OZONE.
4. 2001, EPA, *Fact Sheet Final Approval Of The Houston/Galveston Ozone Attainment Demonstration*, http://www.epa.gov/region6/6xa/sip_factsheet.pdf.
5. 2002, Sandia National Laboratories/California, *Environmental Information Document, Final Draft,* SANDXX-XXX.
6. LDEQ, http://www.deq.state.la.us/evaluation/air_indicators/vocs.htm.
7. 2004, About.com citing EPA, *What is Bad Ozone?*, http://environment.about.com/cs/pollution/f/badozone.htm?terms=ozone+air+pollution.
8. TCEQ, http://www.tnrcc.state.tx.us/oprd/sips/index.html.
9. 2001, DynMcDermott, DynMcDermott Industrial Hygiene, *Baseline Monitoring Summary Report.*
10. 2004, Email communication with the DynMcDermott Waste Management Specialist, Patty Kuntz on July 16,2004
11. 2004, DOE, *Strategic Petroleum Reserve*, *50 Million Barrel Expansion*.
12. 2004, DM, Telephone conversations with C. Costanza and R. Foley on 7/14/2004.
13. 2004, EPA, *Volatile Organic Compounds in Air*, http://www.epa.gov/wtc/voc/.
14. 2004, DOE, *Supplement Analysis of Site-Specific and Programmatic Environmental Impact Statements: Operational and Engineering Modifications, Regulatory Review, and Socioeconomic Variation*, http://www.spr.doe.gov/.
15. 1974, EPA Office of Noise Abatement And Control, *Information On Levels Of Environmental Noise Requisite To Protect Public Health And Welfare With An Adequate Margin Of Safety.*
16. 1975, American Industrial Hygiene Association, *Industrial Noise Manual*, 3rd Edition.
17. 2004, DynMcDermott, Accident Prevention Manual.
18. 2004, DOE, *Strategic Petroleum Reserve*, *50 Million Barrel Expansion*. * *Verified via telephone conversations with W. Elias on 7/15/2004.
19. 1977, DOE, *Final Environmental Statement on the Bryan Mound Salt Dome*, FES 76/77-6
20. 1979, DOE, *Final Environmental Impact Statement (Final of DEIS, FEA-DES-77-10 and of DS-FEIS, FEA-FES-76/77-6) Strategic Petroleum Reserve,* ******** ******** *Salt Domes (Bryan Mound expansion, Allen, Nash, Damon Mound, and West Columbia)* ******** *County, Texas*, *Volumes I–III*, EIS-0021
21. 1981, DOE, Final Supplement to Final Environmental Impact Statements DOE/EIS-0021,0029, *Strategic Petroleum Reserve, Phase III Development* ******* *and* ********** *Salt Domes (West Hackberry and Bryan Mound Expansion, Big Hill Development)* ********* ********** *, Louisiana and* ********** ********* *Texas*, EIS-0075.
22. 1996, EPA Region 6, *Environmental Justice Index Methodology*.
23. 1983, Larkin, Thomas J. and Bomar, George W., *Climatic Atlas of Texas*, Texas Department of Water Resources.

24. 2001, *Climate Normals* from 1971-2000*, Issued November 30, 2001, http://www.ggweather.com/normals/.
25. State of Texas, Department of Economic Development, ******* at http://community.txed.state.tx.us/communities/commpages/340.htm.
26. 2002, EPA, *Wind Roses for Selected Areas*, http://www.epa.gov/ttn/naaqs/ozone/areas/wind.htm. Houston/Galveston/Brazoria, WBAN 12960, Measurements from 1988 – 1992.
27. 2000, Bezanson, David, *Natural Vegetation Types of Texas and Their Representation in Conservation Areas*, The University of Texas at Austin.
28. 1994, Davis, William B. and Schmidly, David J., *The Mammals of Texas*, Texas Parks and Wildlife Department, http://www.nsrl.ttu.edu/tmot1.
29. Revised 1998, Dixon, James R. and Vaughan, R. Kathryn, based upon information from *Amphibians and Reptiles of Texas*, by J. R. Dixon (1987, Texas A&M University Press), http://wfscnet.tamu.edu/tcwc/checklist/brazr020.htm.
30. 1996, Igl, Lawrence D., *Bird Checklists of the United States*, Northern Prairie Wildlife Research Center Home Page, Updated May 12, 2003 http://www.npwrc.usgs.gov/resource/othrdata/chekbird/chekbird.htm.
31. 2004, Texas Parks & Wildlife, Wildlife Diversity, *Annotated County Lists of Rare Species*, ********** *******.
32. 1992, Bureau of Economic Geology, Geology of Texas, http://geology.about.com/library/bl/maps/bltexasmap.htm.
33. 1996, EnecoTech, Multisite Hydrogeological Investigation, Strategic Petroleum Reserve Site, Louisiana and Texas.
34. USDA/NRCS, Official Soil Description, at http://ortho.ftw.nrcs.usda.gov/cgi-bin/osd/osdnamequery.cgi.
35. USDA, NSSC Soil Survey Laboratory Research Database, http://ssldata.nrcs.usda.gov/advquery.asp.
36. 2004, The Texas State Historical Association, *The Handbook of Texas Online*, ********** ********, http://www.tsha.utexas.edu/handbook/online/articles/view/BB/hcb12.html.

Tables

TABLE 3-1

Bryan Mound Air Permit and Emissions Limitations

TCEQ Permit	VOC (TPY)	NOx (TPY)	CO (TPY)	SO_2 (TPY)	PM_{10} (TPY)
6176B (Facility)	17.88	1.79	0.41	0.55	0.07
52962 (Degas)	3.88	15.11	18.99	0.37	1.37
Total	**21.76**	**16.9**	**19.40**	**0.92**	**1.44**

Notes:
TCEQ – Texas Commission on Environmental Quality
VOC – Volatile Organic Compounds
TPY – Tons Per Year
NOx – Nitrogen Oxides
CO – Carbon Monoxide
SO_2 – Sulfur Dioxide
PM_{10} – Particulate Matter less than 10 microns
Facility – storage facility
Degas – degassification unit

DISCLAIMER

This document has been approved for distribution to the public. All information classified by the Department of Energy Strategic Petroleum Reserve as Sensitive Unclassified Information has been removed from this document.

Table 4-1

Estimated VOC Emissions Per Workover By Cavern

BM Cavern	Authorized Cavern Capacity (MMB) (1)	Frac Tank Rate (bbl/day) (2)	Workover Duration (days) (3)	Frac Tank Throughput (bbl) (4)	GOR (scf/bbl) (5)	H_2S (lbs) (6)	VOC (tons) (6)
4	7	1,000	6	6,000	1.0	0	0.28
114	8	1,000	6	6,000	1.1	0	0.31
115	10	1,000	6	6,000	1.1	0	0.32
116	10	1,000	6	6,000	1.0	0	0.28
106 A & C	13	1,000	9	9,000	0.8	8	0.34
5	36	3,000	6	18,000	1.1	21	1.01
105	11	1,000	6	6,000	1.4	13	0.32
108	12	1,000	6	6,000	0.6	7	0.13
109(7)	9	1,000	6	6,000	0.0	24	0.48
110(7)	11	1,000	6	6,000	0.0	42	0.48
TOTAL						**115**	**3.95**

Notes:

BM = Bryan Mound MMB – million barrels bbl/day – barrels per day bbl – barrels GOR – gas to oil ratio
scf/bbl – standard cubic feet per barrel H_2S – hydrogen sulfide lbs – pounds VOC – volatile organic compound

1. Authorized cavern capacity per DOE Level 1 criteria.
2. Frac tank rate (bbl/day) based on 1,000 bbl/day for an average 10 MMB cavern and 3,000 bbl/day for 36 MMB cavern (per D. Moore on 8/3/04).
3. Workover duration will range from 3 to 6 days for all BM caverns and 9 days for BM 106 A & C (per D. Moore on 8/4/04).
4. Frac tank throughput (bbls) = Frac tank rate (bbl/day) * Workover duration (days)
5. GOR and cavern gas compositions obtained from C. Delucca spreadsheet (4/15/04).
6. H_2S and VOC emissions calculated and based on frac tank throughput, GOR & cavern gas compositions.
7. BM Caverns 109 & 110 emissions calculated using EPA TANKS 4.0 software (assuming July workovers).

Table 4-2

Estimated VOC Emissions From Brine Discharge During Workovers

ACTIVITY	NUMBER	BRINE VOLUME (MMB)	VOC FACTOR (TONS/MMB)	VOC (TONS)
Work Overs*	**8**	**1.2**	**0.42**	**0.50**
Work Overs*	**3**	**0.45**	**0.42**	**0.19**
Total	11	1.65	0.42	**0.69**

Notes:

VOC – Volatile Organic Compounds
MMB – million barrels
* Workovers produce 150,000 barrels of brine each.
VOC (tons) = MMB x 0.42

Table 4-3

Estimated VOC Emissions From Brine Discharge During Fill

ACTIVITY	BRINE VOLUME (MMB)	VOC FACTOR (TONS/MMB)	VOC (TONS)
Fill**	**6.49**	**0.42**	**2.73**
Fill**	**7.09**	**0.42**	**2.98**
Fill**	**7.69**	**0.42**	**3.23**
Fill**	**0.73**	**0.42**	**0.31**
Total	**22**	0.42	**9.24**

Notes:

VOC – Volatile Organic Compounds
MMB – million barrels
**1 MMB of oil volume for fill displaces 1 MMB of brine
VOC (tons) = MMB x 0.42
This table assumes that oil receipts to fill the additional 22 MMB of capacity will occur over 4 years with oil receipts being greater early in the schedule.

Table 4-4

Estimated Laboratory Waste Generated From Receipt Of An Additional 22 MMB Of Oil

	Average Barrels of Oil per Oil Receipt (bbls)[1]		Total Number of Barrels to Be Received (bbls)[2]		Estimated Number of Oil Receipts[3]		Laboratory Waste Generated Per Oil Receipt (lbs)[1]		Total Estimated Laboratory Waste Generated For Receipt of 22 MMB of Oil (lbs)[4]
	182,889		22,000,000		120		2.4		**288.7**

Notes:

bbls = barrels

lbs = pounds

(1) Email communication from Shari Gartman, 9/14/2004.

(2) Proposed petroleum inventory increase

(3) Estimated Number of Oil Receipts = Proposed Petroleum InventoryIncrease/Average Barrels of Oil per Oil Receipt

(4) Oil = Estimated Number of Oil Receipts x Laboratory Waste Generated Per Oil Receipt

Table 5-1

Estimated Total Waste Generation From Mitigation Activities

GOR	1.4[(1)]	scf/bbl		
Volume	6,000	bbls		
Gas Produced	8,400	SCF		
VOC Emissions[(2)]	632	lbs		
Propane[(3)]	23.54	mol%		
Carbon Required[(4)]	4,894	lbs		
Total Workovers	11			
Total Carbon[(5)]	**53,830**	**lbs**	26.91	tons
Total Emissions[(6)]	**6952**	**lbs**	3.48	tons
TOTAL WASTE[(7)]	**60,782**	**lbs**	**30.39**	**tons**

Notes:
GOR – gas to oil ratio
Scf/bbl – standard cubic feet per barrel
bbls – barrels
SCF – standard cubic feet
VOC – volatile organic compounds
lbs - pounds
(1) GOR based on the worst case cavern-specific data from BM cavern 105.
(2) As calculated for the worst case gassy cavern in Table 5-2.
(3) Propane is the most volatile component in crude oil.
(4) The carbon required to remove propane, the most volatile component, and later break through components.
(5) Total carbon equals the carbon required times the total number of workovers.
(6) Total emissions equals the worst case VOC emissions times the number of workovers.
(7) Total waste equals the sum of the total carbon and the total emissions.

Table 5-2

Estimated Unmitigated Air Emissions From Worst Case Gassy Cavern (BM Cavern 105)

GOR (1/7/04) =	1.4	scf/bbl		
Volume Oil =	6,000	bbls		
Component	MW	% Mole Flash	Gas (scf)	Emissions (lbs)
Hydrogen Sulfide	34	1.73	145	13
Propane	44	23.54	1,977	230
iso-Butane	58	4.10	344	53
n-Butane	58	11.41	958	147
iso-Pentane	72	3.30	277	53
n-Pentane	72	4.08	343	65
Hexanes	86	2.63	221	50
Heptanes Plus	100	1.33	112	29
Benzene	78	0.16	13	3
Toluene	92	0.10	8	2
Ethyl Benzene	106	0.01	1	0
Xylene	106	0.01	1	0
Total Regulated VOC	(lbs)			**632**
	(tons)			**0.32**

Notes:
GOR – gas to oil ratio
Scf/bbl – standard cubic feet per barrel
Oil – crude oil
bbls - barrels
MW – molecular weight
SCF – standard cubic feet
lbs - pounds
VOC – volatile organic compounds
* - calculations are based on the worst case cavern-specific data from BM cavern 105.

Table 5-3

Estimated Additional VOC Emissions From The Bryan Mound Site Oil Tanks Due To Addition Of Oil From Cavern Workovers During Implementation Of The Proposed Action

Volume of Oil (bbl)	Average Temperature (F)	Days	Vapor Pressure (PSIa)	Throughput (Gallons)	Additional VOC Emissions (Tons)	VOC Standing Losses (Tons)	Total Additional VOC Emissions (Tons)
75,000.00	83	31	6.8	3,150,000	0.447	0.068813831	**0.4**

Notes:
bbl = barrels
F = degrees fahrenheit
PSIa = Pounds per square inch absolute
Oil = crude oil
VOC = volatile organic compounds
Total additional VOC emissions = additional VOC emissions - VOC standing losses

Table 5-4

Estimated VOC Emissions Per Workover By Cavern When Mitigated Using A Flare

BM Cavern	Workover VOC [1]	Mitigated VOC [2]
	(tons)	(tons)
4	0.28	0.01
114	0.31	0.01
115	0.32	0.01
116	0.28	0.01
106 A & C	0.34	0.01
5	1.01	0.02
105	0.32	0.01
108	0.13	0.00
109	0.48	0.01
110	0.48	0.01
TOTAL	**3.95**	**0.08**

Notes:

BM = Bryan Mound

VOC = Volatile Organic Compounds

1. Estimated VOC Emissions per Workover by Cavern was provided in Table 4-1.

2. Estimated VOC emissions when workover emissions are mitigated by use of a flare with a 98% VOC destruction efficiency = Workover VOC X 0.02.

Table 5-5

Estimated NOx and CO Emissions Per Workover By Cavern When Mitigated Using A Flare

BM Cavern	Cavern BTUs [1]	NOx Emissions[2, 3]	CO Emissions[2, 4]
		(lbs)	(lbs)
4	11,824,723	0.80	4.38
114	13,396,147	0.91	4.96
115	13,476,647	0.92	4.99
116	11,837,456	0.80	4.38
106 A & C	14,678,579	1.00	5.43
5	43,349,047	2.95	16.04
105	13,562,534	0.92	5.02
108	5,611,143	0.38	2.08
109	12,819,501	0.87	4.74
110	12,819,501	0.87	4.74
Flare Pilot	143,427,375	9.75	53.07
TOTAL (lbs)		20.18	109.82
TOTAL (tons)		**0.01**	**0.05**

Notes:

BM = Bryan Mound

BTU = British Thermal Unit

NOx = Nitrogen Oxides

CO = Carbon Monoxide

lbs = pounds

1. Cavern BTUs calculated based on cavern gas composition, GOR, and BTU/scf of each gas component, except for Cavern 109 & 110, which were calculated based on the average BTUs of Caverns 4, 114, 115, 116 and 105.

2. NOx and CO emission factors, 0.068 lbs/MMBTU and 0.37 lbs/MMBTU respectively, were obtained from EPA AP-42, Table 13.5.1 (1/91).

3. NOx emissions = 0.068 lbs/MMBTU X Cavern BTUs/1000000.

4. CO emissions = 0.37 lbs/MMBTU X Cavern BTUs/1000000.

Figures

DISCLAIMER

This document has been approved for distribution to the public. All information classified by the Department of Energy Strategic Petroleum Reserve as Sensitive Unclassified Information has been removed from this document.

Figure 2-1
Before Workover

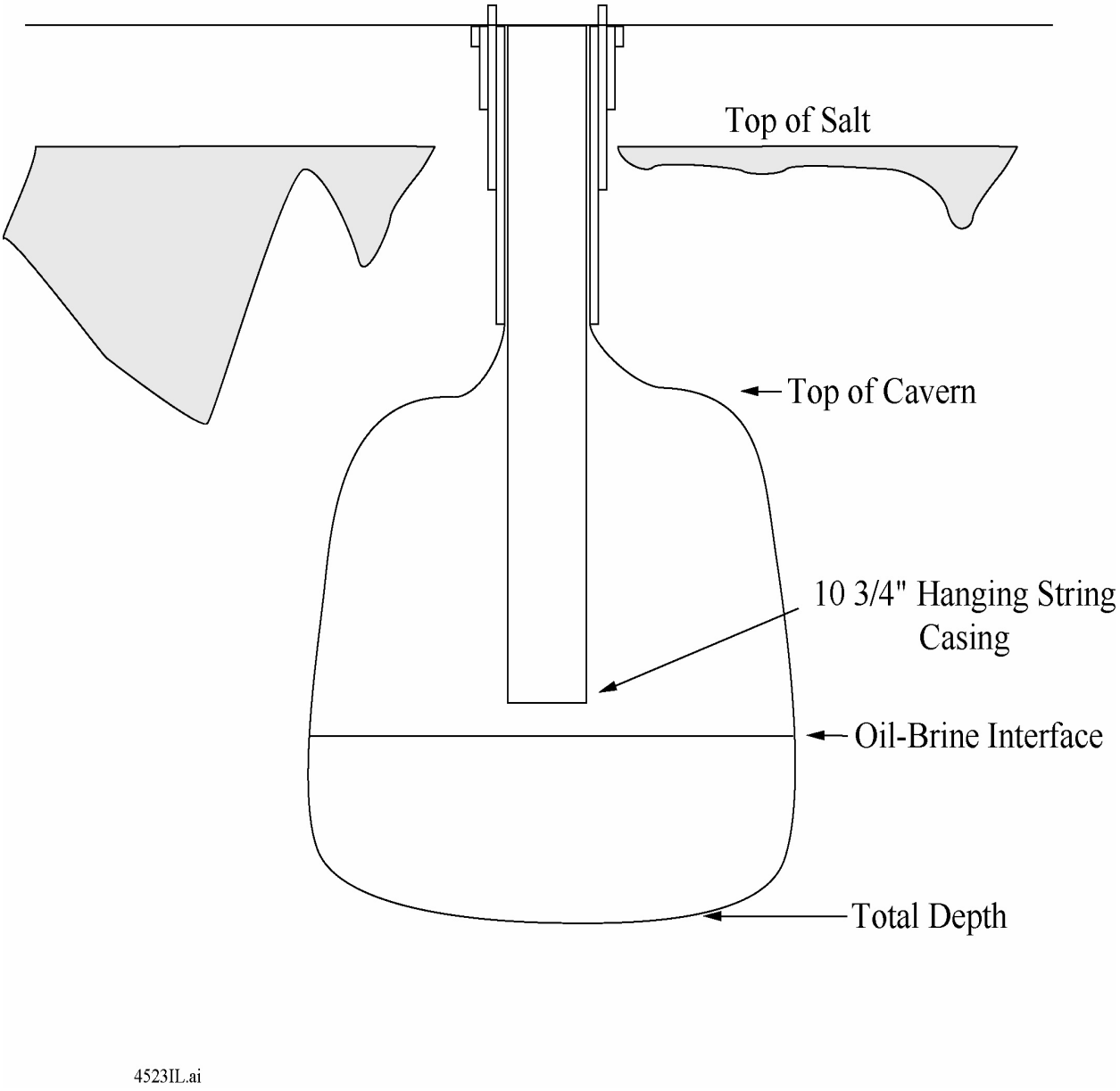
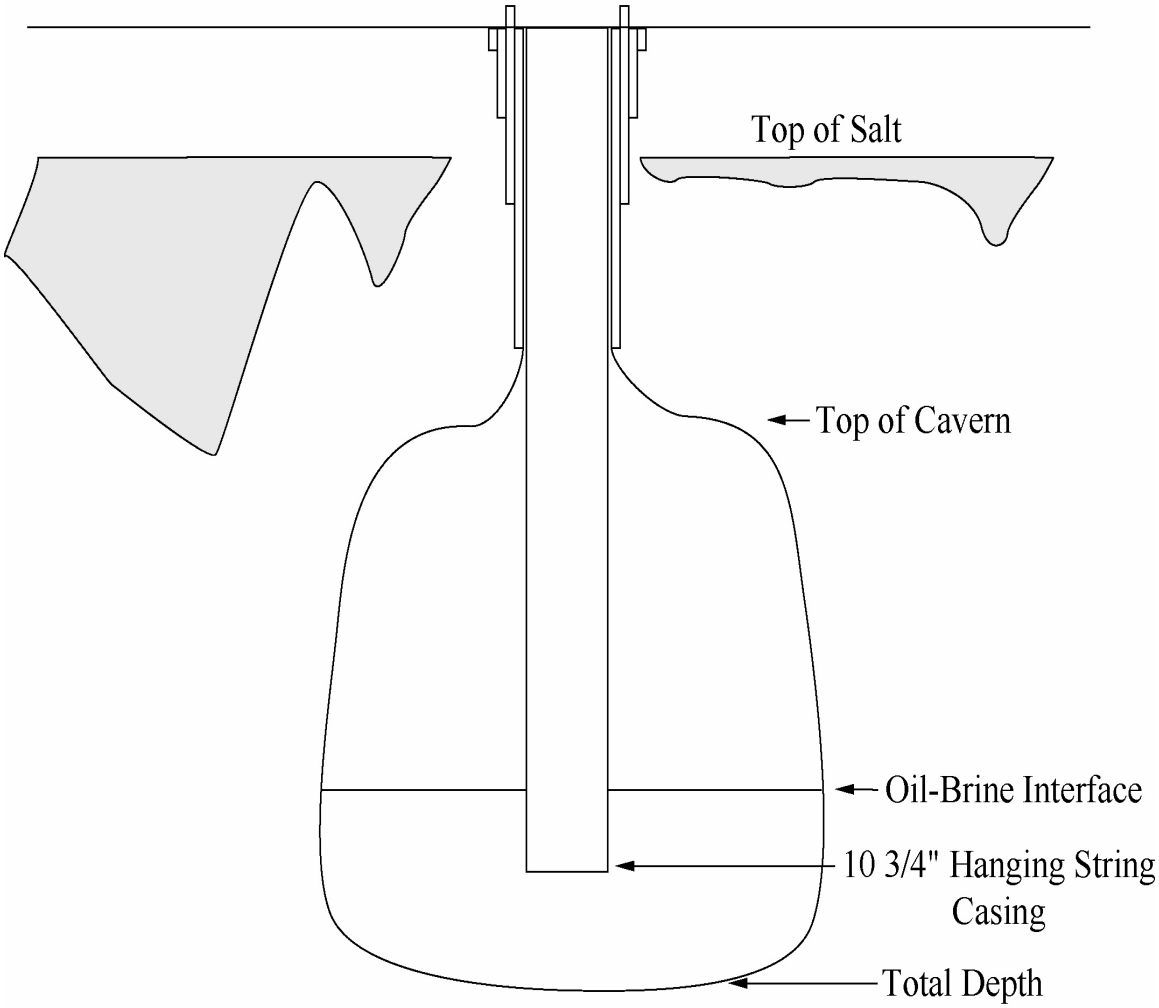


Figure 2-2
After Workover



4524IL.ai

DISCLAIMER

This document has been approved for distribution to the public. All information classified by the Department of Energy Strategic Petroleum Reserve as Sensitive Unclassified Information has been removed from this document.

Appendix A

Notification Letter, Responses, and Response to Comments

Appendix A:

Notification Letter, Responses, and Response to Comments

Public involvement occurred as stated in Section 1.5. The SPR provided written notification of its intention to prepare this National Environmental Policy Act analysis to the parties listed in Chapter 7.0 on July 30, 2004. This notification, a generic version of which is presented in this appendix, included project information and provided the opportunity for parties to make scoping comments on this Environmental Assessment. Five comments were received from parties who were notified of the proposed action via the notification letter. All responses regarding the preparation of the EA were logged into the comment response report, which is also provided in this appendix, and, where appropriate, individual responses were provided to commenters. These initial comment letters and/or communications have been provided for review in this appendix.

On September 28, 2004, all parties were provided the draft EA for their review and comments. The time period for review was 15 days. Where appropriate and to the extent practical, concerns and comments received by the close of the comment period were considered in preparation of the final EA. All responses regarding the draft EA were also logged into the comment response report provided in this appendix, and, where appropriate, individual responses were provided to commenters. Comment letters and/or communications regarding the draft EA have also been provided for review in this appendix.

Date

Contact Name
Agency Name
Agency Address
City, State, Zip Code

Dear *Contact Name*:

INCREASE IN THE SITE CAPACITY AND PETROLEUM INVENTORY AT THE STRATEGIC PETROLEUM RESERVE'S BRYAN MOUND FACILITY, ********** COUNTY, TEXAS

Pursuant to the National Environmental Policy Act, the United States Department of Energy (DOE) intends to prepare an Environmental Assessment for a proposed increase in the cavern capacity and petroleum inventory at the Bryan Mound facility (the site) in ******* , ********* ***** , Texas. The potential environmental impacts of this proposed project will be evaluated in conformance with DOE and Council on Environmental Quality (CEQ) regulations and provisions. A description of the existing site and the proposed project is provided below.

The Bryan Mound facility was developed by the DOE in 1977 to store petroleum that may be presidentially ordered into the marketplace to alleviate the effects of a supply disruption to the United States. The site has operated continuously since 1979 and is currently considered to be filled to its DOE authorized capacity (*** MMB). As such, the site is in standby mode and is classified as a minor source of air emissions.

Under the proposed action, the DOE authorized capacity of the site and, ultimately, the site inventory will be increased by 22 MMB. A portion of the proposed increase would be obtained through the modification of the internal cavern infrastructure. This work will be performed in accordance with current water, air, and Railroad Commission of Texas permit requirements. The balance of the proposed increase would result from administrative activities only. These include the return of an existing cavern to service at its full capacity and volume upgrades based on information obtained during routine measurements of actual cavern size. These activities will not result in the alteration of the footprint of the site nor the disturbance of the land surface within the site. Initial activities as well as activities associated with future fill will be performed without altering the classification of the site as a "minor source" of air emissions.

Your agency has been identified as part of an outreach effort under section 106 of the National Historic Preservation Act and the corresponding state historic preservation regulations. DOE does not anticipate that the proposed action would result in any adverse effects to historic properties. Nevertheless, DOE respectfully requests your comments regarding any potential effects of this proposed project on historic/cultural resources that should be considered during the preparation of the Environmental Assessment for this action.

Please direct any written comments or requests for additional information to Ms. Kathy Batiste, Environmental Specialist, Environmental, Safety, and Health Division, U. S. Department of Energy, Strategic Petroleum Reserve, Project Management Office, 900 Commerce Road East, New Orleans, LA 70123 or (504) 734-4400. We request that comments be received by July 6, 2004. Thank you in advance for your expeditious attention to this project.

Sincerely,

William C. Gibson, Jr.
Project Manager

cc: K. Batiste

Comments on the Draft Environmental Assessment for the Proposed Increase in Facility Capacity and Petroleum Inventory at the Strategic Petroleum Reserve's Bryan Mound Facility

November 2004

Comment Number	Comment made in Response to	Name of Commenter	Affiliation	Comment	Date of Comment	Response	Date of Response
1	Notification Letter	Mr. Chris Browne	Policy Department of the Texas Governor's Office of Budget and Planning (response to D. Francis letter)	Requested, by telephone conversation with K. Batiste and D. Folse, a list of the agencies that have been included on the distribution of the BM Expansion EA notification letters. He is not concerned with reviewing the EA but his responsibility is to insure correct distribution of the information.	Aug. 1, 2004	Per his request, D. Folse has faxed him the attached distribution list at his FAX number 512 936 2681 and he will reply with any additions he may have. D. Folse assured him that no new caverns or wells were included in this project and he said he had no problems with the letter. He said he will return the letter to S. Hunt and that he did not need anything additional such as an email or letter.	Aug. 1, 2004
2	Notification Letter	Mr. Glenn Weitknecht	Enforcement Division of the U.S. Army Corps of Engineers, Galveston District	Mr. Weitknecht merely wanted verbal confirmation that the BM expansion projected covered by the referenced EA notification letter did not include any drilling of new wells or the creation of new caverns at BM. His concern was for any wetland impacts due to such drilling activities.	Aug. 27, 2004		Aug. 27, 2004
3	Notification Letter	Mr. Bill Martin	Texas Historical Commission	Responded that no historic properties will be affected and that the project may proceed.	Aug. 6, 2004	No response necessary.	
4	Notification Letter	Carolyn Murphy	Environmental Section of the U.S. Army Corps of Engineers, Galveston District	Commented that it does not appear that a Department of the Army permit will be necessary for the proposed action.	Aug. 26, 2004	No response necessary.	
5	Notification Letter	Denise S. Francis	Texas Governor's Office of Budget, Planning, and Policy	Commented that proper State notifications had been made and no additional entities were being designated.	Aug. 20, 2004	No response necessary.	

Comments on the Draft Environmental Assessment for the Proposed Increase in Facility Capacity and Petroleum Inventory at the Strategic Petroleum Reserve's Bryan Mound Facility

November 2004

6	Review of Draft EA	Russell Hooten	Texas Parks and Wildlife Department	Commented on the use of revised list of rare, threatened, and endangered species with the potential to occur in [redacted] County, potential removal of fill material and disposal areas for fill material, use of machinery and construction-related materials in previously disturbed upland areas, absence of information regarding procedure for modifying cavern infrastructure, and precautionary/monitoring activities during expansion activities.	September 28, 2004	Discussion with Russell Hooten regarding a comment made about potential removal and disposal of fill material revealed that their concern was regarding cavern changes that were - merely administrative in nature. TPWD wanted to ensure that no excavation were to accompany the administrative changes. Drafted response letter (attached) to address each concern, issue and recommendation.	November 4, 2004
7	Presentation of Draft EA during quarterly meeting	R.C. Thoms	Environmental Advisory Committee	Commented on the verbiage regarding subjectivity to man-made hazards and use of clarifying terms regarding the psi during workover.	October 18, 2004	No response necessary. Comments incorporated into document.	October 18, 2004
8	Presentation of Draft EA during quarterly meeting	E. Overton	Environmental Advisory Committee	Commented on use of significant figures.	October 18, 2004	No response necessary. Comments incorporated into document.	October 18, 2004
9	Review of Draft EA	Carolyn Murphy	Environmental Section of the U.S. Army Corps of Engineers, Galveston District	Commented that it does not appear that a Department of the Army permit will be necessary for the proposed action and provided a Reference Determination Number D-16628.	October 25, 2004	No response necessary.	

Bigelow, Christina

From: Folse, David
Sent: Thursday, August 19, 2004 2:46 PM
To: Batiste, Katherine
Cc: Bozzo, William; Bigelow, Christina; Baxter, Terry
Subject: BM EA Response to Mr. Chris Bowne - Policy Department of the Texas Governor's Office of Budget and Planning

A few minutes ago, Mr. Chris Bowne of the Policy Department of the Texas Governor's Office of Budget and Planning requested, by telephone conversation with you and I, a list of the agencies that have been included on the distribution of the BM Expansion EA notification letters. He is not concerned with reviewing the EA but his responsibility is to insure correct distribution of the information. Per his request, I have faxed him the attached distribution list at his FAX number 512 936 2681 and he will reply with any additions he may have. I will let you know if he responds and we will include this in the administrative record.

BM draft List of Int Partiesre...

Bigelow, Christina

From: Folse, David
Sent: Friday, August 27, 2004 11:24 AM
To: Batiste, Katherine
Cc: Bozzo, William; Bigelow, Christina; Baxter, Terry
Subject: BM EA Response to Mr. Glenn Weitknecht of GALCOE Enforcement Division

A few minutes ago, I called Mr. Glenn Weitknecht of the Enforcement Division of the U.S. Army Corps of Engineers, Galveston District in response to his voice message which you forwarded to me. Mr. Weitknecht was looking at the letter sent to Mr. Hunt of GALCOE on 30 July 2004 and merely wanted verbal confirmation that the BM expansion projected covered by the referenced EA notification letter did not include any drilling of new wells or the creation of new caverns at BM. His concern was for any wetland impacts due to such drilling activities. I assured him that no new caverns or wells were included in this project and he said he had no problems with the letter. He thanked me for the quick response, said he will return the letter back upstairs and he did not need anything additional from me such as an email or letter. His phone number is 409-766-3198. This response will be added to the administrative record.

DISCLAIMER

This document has been approved for distribution to the public. All information classified by the Department of Energy Strategic Petroleum Reserve as Sensitive Unclassified Information has been removed from this document.

Mr. Bill Martin

the footprint of the site nor the disturbance of the land surface within the site. Initial activities as well as activities associated with future fill will be performed without altering the classification of the site as a "minor source" of air emissions.

Your agency has been identified as part of an outreach effort under Section 106 of the National Historic Preservation Act and the corresponding state historic preservation regulations. DOE does not anticipate that the proposed action would result in any adverse effects to historic properties. Nevertheless, DOE respectfully requests your comments regarding any potential effects of this proposed project on historic/cultural resources that should be considered during the preparation of the Environmental Assessment for this action.

Please direct any written comments or requests for additional information to Ms. Kathy Batiste, Environmental Specialist, Environmental, Safety, Health and Quality Division, U.S. Department of Energy, Strategic Petroleum Reserve Project Management Office, 900 Commerce Road East, New Orleans, Louisiana 70123 or (504) 734-4400. We request that comments be received by August 16, 2004. Thank you in advance for your expeditious attention to this project.

Sincerely,

William C. Gibson, Jr.
Project Manager

FE-4441 (KBatiste)

NO HISTORIC
PROPERTIES AFFECTED
PROJECT MAY PROCEED

y _____
or F. Lawarence Oaks
State Historic Preservation Officer
ate 8/6/04

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P.O. BOX 1229
GALVESTON, TEXAS 77553-1229

REPLY TO
ATTENTION OF:

August 26, 2004

Environmental Section

Mr. William Gibson, Jr.
Project Manager
Department of Energy
Strategic Petroleum Reserve Project Management Office
900 Commerce Road East
Houston, Texas 70123

Dear Mr. Gibson:

This is in response to your letter with accompanying action and property description concerning the proposed increase in the capacity and inventory at the Bryan Mound facility, as submitted to us for review and comment. The site is located at the Bryan Mound Facility, [redacted] Texas. The letter and accompanying information were reviewed by elements of the Planning, Environmental, and Regulatory Division and the Engineering and Construction Division. Our only comment is that, based on the submitted information, the proposed activities do not appear to require a Department of the Army permit (Reference Determination Number D-16407).

We appreciate the opportunity to review and comment upon the proposed project and trust that this response facilitates your planning and implementation process.

Sincerely,

Carolyn Murphy
Chief, Environmental Section

CF:
PE-RE, Mr. Nanninga
PE, Ms. Trevino

Texas Review and Comment System
Review Notification

Applicant/Origination Agency: DOE
Contact Name: Mr. William Gibson
Contact Phone: 504-734-4400
Email:

Project Name: DOE - Bryan Mound Brazoria County Texas EA

Funding Agency:
Date Received: 8/20/2004 [redacted] **Date Comments Due BPO:** 8/20/2004

Review Participants

Agencies **Cogs**

Special Notes/Comments:

[redacted] Therefore no entities have been designated. A list of contacts has been provided by the applicant to ensure the information has been disseminated. See Attached. Disregard forwarding instructions below.

Review Agency **Signature**

Return Comments to: Denise S. Francis

Denise S. Francis, State Single Point of Contact
Governor's Office of Budget, Planning & Policy
P.O. Box 12428
Austin, TX 78711
(512) 463-8465

Your proposal/notification of intent has been received. You should respond "yes" when asked if this program is subject to E.O. 12372. The above entities have been designated as review participants. Please forward one copy of your proposal (including 424, budget document, abstract and project narrative) with one copy of this review notification to each review participant identified above. Please include the assigned State Application Identifier assigned above on each forwarded proposal. If you submitted a notification of intent please also send one copy of your proposal to the State Single Point of Contact (SPOC) address above. Please refer to the SAI number when communicating with our office regarding your proposal. A copy of any comments received about the application will later be sent to your organization as well as the funding agency. If you have any questions please call (512) 463-8465 for clarification.

Do we need to do something w/this or is this just NOTIFICATION? Dan

9-28-04

04-ESH&Q-047

Mr. Bill Martin
Texas Historical Commission
P.O. Box 12276
Austin, TX 78711-2276

Dear Mr. Martin:

DRAFT ENVIRONMENTAL ASSESSMENT FOR THE INCREASE IN THE SITE CAPACITY AND PETROLEUM INVENTORY AT THE STRATEGIC PETROLEUM RESERVE'S BRYAN MOUND FACILITY, BRAZORIA COUNTY, TEXAS

Pursuant to the National Environmental Policy Act (NEPA), the U.S. Department of Energy (DOE) has prepared a draft Environmental Assessment (EA) for a proposed increase in the cavern capacity and petroleum inventory at the Bryan Mound facility in [redacted] County, Texas. The potential environmental impacts of this proposed project have been evaluated in this EA in conformance with DOE and Council on Environmental Quality regulations and provisions. Your agency was identified as part of an outreach effort under Section 106 of the National Historic Preservation Act and the corresponding state historic preservation regulations and has responded that no historic properties will be affected and that the project may proceed.

The draft EA is available electronically via the Strategic Petroleum Reserve website at http://www.spr.doe.gov, Environmental, Safety and Health, should your agency want to provide additional comments or request additional information. Please direct any written comments or requests for additional information to Ms. Kathy Batiste, NEPA Compliance Officer, Environmental, Safety, Health and Quality Division, U.S. Department of Energy, Strategic Petroleum Reserve Project Management Office, 900 Commerce Road East, New Orleans, Louisiana 70123 or (504) 734-4400. The comment period will conclude on October 21, 2004. Thank you for your interest in this project.

Sincerely,

William C. Gibson, Jr.
Project Manager

FE-4441:(KBatiste)

Enclosure

cc (w/enclosure):
D. Folse, EF-20
bcc:
FE-44 Read/Chron/FE-444 Read/FE-4441 Read/Official File #_____
FE-4441:KBatiste:4400:cr:09/13/04(WPC) (W:\ESH\L-04-047-Martin)

September 28, 2004

Kathy Batiste
Environmental Specialist
Department of Energy
Strategic Petroleum Reserve Project Management Office
900 Commerce Road East
New Orleans, LA 70123

RE: Preparation of an Environmental Assessment for a proposed increase in site capacity and petroleum inventory at the strategic petroleum reserve's Bryan Mound Facility, Brazoria County, Texas

Dear Ms. Batiste:

This letter is in response to your request for information concerning the impacts upon fish, wildlife and plant resources that should be considered and incorporated in an Environmental Assessment (EA) for the proposed project referenced above. Texas Parks and Wildlife Department (TPWD) staff reviewed the information provided and offer the following comments and recommendations.

The proposed project involves increasing the capacity of the Bryan Mound Facility strategic petroleum reserve by 22 million barrels. The proposed increase would be accomplished in part by modifying the internal cavern infrastructure. Additional increases in capacity would be achieved by administrative activities, including returning an existing cavern to service. The footprint of the construction site will not increase beyond the bounds of the existing facility as a result of the proposed action and no disturbance of the land surface at the site will occur.

Per your request for information regarding potential impacts to threatened and endangered species, I have enclosed an updated list of rare, threatened and endangered species with potential to occur in [redacted]. For information on specific occurrences of rare, threatened and endangered species in your project area, please contact Celeste Brancel at (512) 912-7021, 3000 S. IH-35, Suite 100, Austin, Texas 78704.

Information regarding the removal and potential disposal areas of fill material should also be included in the EA. In general, potential disposal areas should be confined and should be located on previously disturbed upland sites.

The proposed construction site, Bryan Mound, is located along the [redacted] among numerous coastal wetlands and waterways including the [redacted]

4200 SMITH SCHOOL ROAD
AUSTIN, TEXAS 78744-3291
512-389-4800

www.tpwd.state.tx.us

River which may be utilized by wildlife, particularly birds. Although no construction activities are proposed to occur on the surface, all machinery, and associated petroleum products and construction equipment should be located in upland areas during construction to prevent the possible contamination of these nearby aquatic systems and surrounding soils.

Although it is stated in the provided document that all work will comply with Texas Railroad Commission permit requirements, no information regarding the specific construction activities that will be used to modify the internal cavern infrastructure was provided. Also, the Department requests information regarding precautionary measures that will be taken and monitoring activities that will be made to ensure the expansion work in the cavern does not allow or cause leaks or discharges of petroleum into the groundwater system.

Thank you for providing the opportunity to comment. Please contact me at (361) 825-3240 if we may of further assistance.

Sincerely,

Russell Hooten

Russell Hooten
Wildlife Habitat Assessment Program
Wildlife Division

/rh

Attachment

[redacted] COUNTY

	Federal Status	State Status
***** BIRDS *****		
American Peregrine Falcon (*Falco peregrinus anatum*) - potential migrant; nests in west Texas	DL	E
Arctic Peregrine Falcon (*Falco peregrinus tundrius*) - potential migrant	DL	T
Attwater's Greater Prairie-chicken (*Tympanuchus cupido attwateri*) - county within historical distribution; open prairies of mostly thick grass one to three feet tall; from near sea level to 200 feet along coastal plain on upper two-thirds of Texas coast; males form communal display flocks during late winter-early spring; booming grounds important; breeding February-July	LE	E
Bald Eagle (*Haliaeetus leucocephalus*) - found primarily near seacoasts, rivers, and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds	LT-PDL	T
Black Rail (*Laterallus jamaicensis*) - salt, brackish, and freshwater marshes, pond borders, wet meadows, & grassy swamps; nests in or along edge of marsh, sometimes on damp ground, but usually on mat of previous year's dead grasses; nest usually hidden in marsh grass or at base of Salicornia		
Brown Pelican (*Pelecanus occidentalis*) - largely coastal and near shore areas, where it roosts on islands and spoil banks	LE	E
Henslow's Sparrow (*Ammodramus henslowii*) - wintering individuals (not flocks) found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking; likely to occur, but few records within this county		
Mountain Plover (*Charadrius montanus*) - shortgrass plains and plowed fields (bare, dirt fields); primarily insectivorous; winter resident in this area		
Piping Plover (*Charadrius melodus*) - wintering migrant along the Texas Gulf Coast; beaches and bayside mud or salt flats	LT	T
Reddish Egret (*Egretta rufescens*) - resident of the Texas Gulf Coast; brackish marshes and shallow salt ponds and tidal flats; nests on ground or in trees or bushes, on dry coastal islands in brushy thickets of yucca and prickly pear		T
Snowy Plover (*Charadrius alexandrinus*) - wintering migrant along the Texas Gulf Coast beaches and bayside mud or salt flats		
Sooty Tern (*Sterna fuscata*) - predominately "on the wing"; does not dive, but snatches small fish and squid with bill as it flies or hovers over water; breeding April-July		T
Swallow-tailed Kite (*Elanoides forficatus*) - lowland forested regions, especially swampy areas, ranging into open woodland; marshes, along rivers, lakes, and ponds; nests high in tall tree in clearing or on forest woodland edge, usually in pine, cypress, or various deciduous trees		T
White-faced Ibis (*Plegadis chihi*) - prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats		T
White-tailed Hawk (*Buteo albicaudatus*) - near coast on prairies, cordgrass flats, and scrub-live oak; further inland on prairies, mesquite and oak savannas, and mixed savanna-chaparral; breeding March-May		T

	Federal Status	State Status
Whooping Crane *(Grus americana)* - potential migrant; winters in and around Aransas National Wildlife Refuge and migrates to Canada for breeding; only remaining natural breeding population of this species	LE	E
Wood Stork (*Mycteria americana*) - forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960		T

*** BIRDS-RELATED ***

Colonial waterbird nesting areas - many rookeries active annually
Migratory songbird fallout areas - oak mottes and other woods/thickets provide foraging/roosting sites for neotropical migratory songbirds

*** MAMMALS ***

Black Bear (*Ursus americanus*) - within historical range of Louisiana Black Bear in eastern Texas, Black Bear is federally listed threatened and inhabits bottomland hardwoods and large tracts of undeveloped forested areas; in remainder of Texas, Black Bear is not federally listed and inhabits desert lowlands and high elevation forests and woodlands; dens in tree hollows, rock piles, cliff overhangs, caves, or under brush piles	T/SA; NL	T
Jaguarundi (*Herpailurus yaguarondi*) - thick brushlands, near water favored; six month gestation, young born twice per year in March and August	LE	E
Louisiana Black Bear (*Ursus americanus luteolus*) - possible as transient; bottomland hardwoods and large tracts of inaccessible forested areas	LT	T
Ocelot (*Leopardus pardalis*) - dense chaparral thickets; mesquite-thorn scrub and live oak mottes; avoids open areas; breeds and raises young June-November	LE	E
Plains Spotted Skunk (*Spilogale putorius interrupta*) – catholic in habitat; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie		
West Indian Manatee (*Trichechus manatus*) – Gulf and bay system; opportunistic, aquatic herbivore	LE	E

*** REPTILES ***

Atlantic Hawksbill Sea Turtle *(Eretmochelys imbricata)* - Gulf and bay system	LE	E
Green Sea Turtle *(Chelonia mydas)* - Gulf and bay system	LT	T
Gulf Saltmarsh Snake (*Nerodia clarkii*) - saline flats, coastal bays, & brackish river mouths		
Kemp's Ridley Sea Turtle *(Lepidochelys kempii)* - Gulf and bay system	LE	E
Leatherback Sea Turtle *(Dermochelys coriacea)* - Gulf and bay system	LE	E
Loggerhead Sea Turtle *(Caretta caretta)* - Gulf and bay system	LT	T
Smooth Green Snake (*Liochlorophis vernalis*) - Gulf Coastal Plain; mesic coastal shortgrass prairie vegetation; prefers dense vegetation		T
Texas Diamondback Terrapin (*Malaclemys terrapin littoralis*) - coastal marshes, tidal flats, coves, estuaries, and lagoons behind barrier beaches; brackish and salt water; burrows into mud when inactive; may venture into lowlands at high tide		

	Federal Status	State Status
Texas Horned Lizard (*Phrynosoma cornutum*) - open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September		T
Timber/Canebrake Rattlesnake (*Crotalus horridus*) - swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland; limestone bluffs, sandy soil or black clay; prefers dense ground cover, i.e. grapevines or palmetto		T

*** VASCULAR PLANTS ***

Coastal gay-feather *(Liatris bracteata)* - endemic; black clay soils of prairie remnants; flowering in fall

Texas windmill-grass (*Chloris texensis*) - endemic; sandy to sandy loam soils in open to sometimes barren areas in prairies and grasslands, including ditches and roadsides; flowering in fall

Threeflower broomweed *(Thurovia triflora)* - endemic; black clay soils of remnant grasslands, also tidal flats; flowering July-November

Status Key:
- LE,LT - Federally Listed Endangered/Threatened
- PE,PT - Federally Proposed Endangered/Threatened
- E/SA,T/SA - Federally Endangered/Threatened by Similarity of Appearance
- C1 - Federal Candidate, Category 1; information supports proposing to list as endangered/threatened
- DL,PDL - Federally Delisted/Proposed for Delisting
- NL - Not Federally Listed
- E,T - State Endangered/Threatened
- "blank" - Rare, but with no regulatory listing status

Species appearing on these lists do not all share the same probability of occurrence. Some species are migrants or wintering residents only, or may be historic or considered extirpated.

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT,CORPS OF ENGINEERS
P. O. BOX 1229
GALVESTON, TEXAS 77553-1229

RECEIVED 10/27/0

REPLY TO
ATTENTION OF

Environmental Section

October 25, 2004

Mr. William C. Gibson, Jr.
Department of Energy
Strategic Petroleum Reserve Project Management Office
900 Commerce Road East
New Orleans, LA 70123

Dear Mr. Gibson:

This is in response to your letter with accompanying map and project narrative, concerning the proposed increase in site capacity and petroleum inventory at the Strategic Petroleum Reserve's Bryan Mound Facility, [redacted] County, Texas, as submitted to us for review and comment. The letter and accompanying information were reviewed by elements of the Planning, Environmental, and Regulatory Division and the Engineering and Construction Division. Our only comment is that, based on the submitted information, the proposed activities do not appear to require a Department of the Army permit (Reference Determination Number D-16628).

We appreciate the opportunity to review and comment upon the proposed project and trust that this response facilitates your planning and implementation process. If you have any questions, please contact Ms. Danna Svejkosky at 409-766-6383.

Sincerely,

Carolyn Murphy

Carolyn Murphy
Chief, Environmental Section

November 4, 2004

Mr. Russell Hooten
Texas Parks and Wildlife Department
Wildlife Habitat Assessment Program
Wildlife Division
4200 Smith School Road
Austin, TX 78744-3291

Subject: Increase in the Site Capacity and Petroleum Inventory at the Strategic Petroleum Reserve's Bryan Mound Facility, ********* County, Texas

Reference: (1) Correspondence Hooten (TPWD) to Batiste (DOE), dated September 28, 2004
(2) Phone Call Bigelow (DM) to Hooten (TPWD) on October 26, 2004

Dear Mr. Hooten:

The United States Department of Energy (DOE) appreciates your response concerning impacts upon fish, wildlife, and plant resources set forth in the Draft Bryan Mound (BM) Environmental Assessment (EA). This response letter, addresses the comments, recommendations, and concerns expressed in your letter (Reference 1).

Thank you for your enclosure of the most recent list of the rare, threatened and endangered species with the potential to occur in ********* County. This updated list was considered in the preparation of the Draft EA and was attached as Appendix G of the Draft EA. An updated list had been requested and received from Nancy Gillespie of the Texas Parks and Wildlife Department (TPWD) on July 2, 2004. A comparison of the lists revealed that they are identical.

TPWD's concern regarding disposal of fill material is noted. However, removal or disposal of fill material during or as a result of the proposed action is not anticipated. Per the above referenced telephone conversation (Reference 2), modifications to cavern infrastructure to create approximately 8.8 million barrels (MMB) will be limited to piping modifications, which are presented in a detailed procedure in Appendix C of the Draft EA. The remaining 13.2 MMB of the proposed increase in storage capacity will result from administrative actions comprised of requests to the Railroad Commission of Texas (RCT) for recognition of existing capacity in several caverns on-site and authorization to use existing capacity for storage of oil. These actions to amend existing RCT permits regarding cavern capacity were presented in Section 4.1.1.4 of the Draft EA. This existing expanded capacity has resulted from incidental

leaching of the salt in the caverns following the introduction of freshwater to facilitate delivery of oil from the caverns during previous oil exchanges. This leaching was anticipated in the initial design of the caverns and evaluated in previous NEPA documentation. No excavation or additional leaching is proposed to increase cavern capacity at the BM facility.

The DOE would like to assure TPWD that all construction activities will occur within the existing site footprint, which is a previously disturbed upland area. All construction-related products and equipment will be utilized within the active facility and confined to areas that are currently concreted, such as the cavern well pads and site roads. Relative to the potential for contamination of nearby aquatic systems and surrounding soils, the equipment utilized during workovers as contemplated in the Draft EA include blowout preventers that meet State regulatory requirements and all hanging string adjustments will be conducted at or near 0 pounds per square inch (at the wellhead). Both of these precautionary measures minimize the potential for oil-related impacts to surrounding areas during workover activities.

The BM facility operates under both a United States Environmental Protection Agency's (EPA's) National Pollutant Discharge Elimination System (NPDES) permit and a Texas Pollutant Discharge Elimination System (TPDES) as regulated by the Railroad Commission of Texas. Copies of the NPDES permit (TX0074012) and the TPDES permit (UHS-004) will be provided upon request. Each cavern well pad at the BM facility is equipped with an oil/water separator and all runoff from these areas are controlled, directing drainage primarily through the oil/water separators. Storm water released from these confined areas is analyzed for pollutants and reported in accordance with the requirements of the aforementioned NPDES and TPDES permits.

Additional precautionary measures in place at the site that will be utilized during implementation of the proposed action include:

- The presence of a trained emergency response team and a vacuum truck on-site;
- The placement of fractionation tanks within the well pad containment dike;
- The use of high pressure rated hoses;
- The use of a certified well control crew; and
- Twenty-four hour surveillance on-site.

Thank you again for your interest regarding the proposed action. Please direct any further written comments or requests for additional information to Ms. Kathy Batiste, NEPA Compliance Officer, Environmental, Safety, and Health Division, U. S. Department of Energy, Strategic Petroleum Reserve, Project Management Office, 900 Commerce Road East, New Orleans, LA 70123 or (504) 734-4400.

Sincerely,

William C. Gibson, Jr.
Project Manager
Strategic Petroleum Reserve

cc: K. Batiste

Appendix B

Resources Eliminated From Further Consideration and Analysis

Resources Eliminated From Further Consideration and Analysis

A discussion of resource categories that are ***not*** affected by the proposed action is presented in this appendix. An explanation of the absence of effects and the results of any preliminary determinations are provided as appropriate below.

Environmental Justice

An environmental justice (EJ) analysis was conducted for the Bryan Mound (BM) storage facility (facility) during preparation of the *Supplement Analysis of Site-Specific and Programmatic Environmental Impact Statements: Operational and Engineering Modifications, Regulatory Review, and Socioeconomic Variation (Supplement Analysis)*[14]. The results of a screening analysis conducted by ICF Consulting (CEQ, 1997) indicated that the population adjacent to the BM facility was greater than 50% minority and 36% impoverished[14]. Thus, this facility exhibited characteristics that indicated a potential for classification of adjacent communities as EJ communities[14]. Further analysis using a regional screening tool, the Environmental Justice Index Methodology[22], was conducted and resulted in a degree of vulnerability below the threshold, removing the need for further evaluation[14].

Floodplains and Wetlands

Based on the determination that the proposed action occurs within the existing facility footprint and does not affect wetlands, the requirement to prepare a wetlands assessment was not applicable to the proposed action. Additionally, that the proposed action does not disturb the land surface and, therefore, does not occur within the existing floodplain but below it, supports the determination that the requirement for a floodplains assessment is also inapplicable. No further assessment is necessary.

Clean Air Act Conformity

The requirement to prepare a conformity determination is not applicable to this proposed action despite the location of the BM facility within the Houston-Galveston-Brazoria non-attainment area as projected emissions from the proposed action will not exceed the prescribed rates for any criteria pollutant. The requirement to determine the conformity of non-transportation related Federal actions to state or Federal implementation plans (Clean Air Act) is applicable only when the proposed action would occur in a non-attainment or maintenance area and the total of the direct and indirect emissions would exceed rates set forth at 40 Code of Federal Regulations 93.153(b)(1) or (2). Emissions from the proposed action will not exceed the prescribed rates.

Protection of Children

An analysis to determine whether the BM facility was compliant with the spirit of Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, was conducted during preparation of the *Supplement Analysis*[14]. BM did

have a greater percentage of population that was comprised of children than the state in which it was located[14]. However, that the facility is isolated, has controlled entry due to fencing and security measures and limited accessibility negates the need for additional analysis[14].

Essential Fish Habitat

Section 305 (b)(2) of the amended Magnuson-Stevens Act requires Federal Agencies to consult with the Secretary of Commerce for a proposed action if the agency determines that their action may adversely affect essential fish habitat (EFH) for federally-managed species of fish. As the proposed action will not result in any surface disruptions in water nor significantly affect water quality in nearby waterbodies, it has been determined that EFH will not be affected by the proposed action and, therefore, the consultation requirement is inapplicable.

Prime Farmland

As the proposed action occurs entirely within the existing facility footprint, conversion of prime farmland for non-agricultural use is not an issue. As such, the requirement to identify and account for adverse effects of a proposed action on the preservation of farmland and consider alternative actions to lessen any adverse effects is inapplicable.

Fish and Wildlife Coordination Act

Also, as the proposed action will not involve the control and/or modification of any nearby waterbodies, it has been determined that the requirement for Federal agencies to consult with the United States (U.S.) Fish and Wildlife Service [16 U.S. Code 662(a)] is inapplicable. This requirement is only applicable when said action involves the control and/or modification of the waters of any body of water.

General Regional and Facility Environment

The general regional and facility environment includes the climate, land use and aesthetic resources at the facility and adjacent area. As the proposed action will be performed on-site in previously developed/disturbed areas and without disturbance to the land surface other than as associated with typical facility operations, it is unlikely that these resources will be affected by implementation of the proposed action. A brief discussion of these resources is provided below for completeness only.

Existing Regional and Facility Climate

The regional climate near the BM facility is a “modified marine” climate, a marine climate with a predominant onshore flow of tropical maritime air that is modified by decreasing moisture content (east to west) and seasonal intrusions of continental air[23]. The climate near the facility is a Subtropical Humid climate most noted for warm summers, a sub-classification of the “modified marine” climate[23]. In ********* , the

closest urban area to the BM facility, the average temperature and rainfall are 69.8 degrees Fahrenheit and 50.7 inches, respectively[24] with approximately 325 days of sunshine per year[25]. The average annual predominant wind direction and speed is toward the northwest at 11 to 16 knots with calm winds approximately 3% of the time[26]. As the proposed action is comprised of actions comparable to typical facility operations and will be performed on-site within the existing facility footprint, it is unlikely that the existing climate will be affected by implementation of the proposed action.

Land Use and Aesthetics

The BM facility is located within the group of communities known as ****** [19,20]. The area is highly industrialized, with petroleum-related facilities representing a significant share of the economy[19,20]. East of the facility, there are industrial facilities and the ******** Harbor facilities[19,20]. South of the facility, there are marsh and spoil areas[19,20]. Immediately adjacent to the facility is **** Lake, a former disposal area for drilling mud[19,20]. The continued industrial use of the BM facility and its proximity is compatible with the general land use patterns in the ******** area[19,20]. Also no adjacent aesthetic resources will be adversely affected by implementation of the proposed action as, at no time, will the proposed action result in alteration of the footprint of the facility or disturbance of the land surface within the facility. Aesthetics of the facility and adjacent area will, therefore, remain unchanged.

Archeological, Cultural, and Historical Resources

As the proposed action will be performed on-site in developed areas and within the existing facility footprint, it is highly unlikely that any archeological, cultural and historical resources will be affected by implementation of the proposed action. The TX Historical Commission has recognized BM for its historical significance and contribution to the development of ********* in 1968. Affected areas were assessed for impacts to archeological, cultural, and historical resources in previous NEPA documents.

Socioeconomics and Demographics

As the proposed action will be conducted with the existing management and operating contractor's workover crew, socioeconomics in the vicinity of the BM facility will not be affected by implementation of the proposed action. No further analysis of socioeconomics and/or demographics is necessary as no impacts to these are foreseeable. Additional information on the demographics and socioeconomics in the vicinity of the BM facility is available in the recent *Supplement Analysis*.

Biological and Ecological Resources

Biological and ecological resources include wildlife and vegetation in areas adjacent to the facility. As the proposed action will be performed on-site and without disturbance to the land surface, it is unlikely that these resources will be affected by the proposed action. A discussion of these resources is provided below for completeness only.

Vegetation

Within the facility, the native vegetation has been developed for industrial use and, while some vegetation does exist on-site, it has been disturbed since site development and will not be further affected as the proposed action will occur within developed portions of the facility. Vegetation on-site consists of normal commercial-type seeded grasses around the buildings and some naturally occurring native grasses. Seeded grasses are maintained year round. Native grasses are allowed to grow from August to March only. Patches of vegetation may provide temporary habitat for wildlife. The facility is generally located in the Gulf Prairies and Marshes vegetation region with native cover of bluestem grassland, pecan-elm forest, or converted cropland[27].

Wildlife

Numerous terrestrial wildlife species are known to be present within the eco-region adjacent to the BM facility. Although some habitat may exist within the facility boundaries due to sporadic areas of vegetation cover, this habitat has been disturbed since the site development and does not present sufficient habitat to support wildlife on-site with the exception of random occurrences. Thus, the sporadic incidence of wildlife on-site will not be affected as any implementation of the proposed action will occur within the developed portions of the facility, which do not present suitable habitat for wildlife. Wildlife principally present in the East TX region is presented in Appendix F[28,29,30].

Threatened and Endangered Species

In 1973, Congress and the State of TX enacted Endangered Species Acts to foster the preservation of species whose presence was declining. There are currently five federally-listed endangered, four federally-listed threatened species, ten state-listed endangered species and sixteen state-listed threatened species known to be present in ********* ********* , TX. A complete list of threatened and/or endangered species including common and scientific names has been provided in Appendix G[31]. Although some habitat for threatened and/or endangered species may exist within the facility boundaries, this habitat has been disturbed since the site development and does not present sufficient habitat to support threatened and/or endangered species on-site with the exception of random occurrences. Thus, the potential for sporadic incidences of threatened and/or endangered species on-site will not be directly affected as implementation of the proposed action will occur within the developed portions of the facility, which do not present suitable habitat for threatened and/or endangered species.

Parks and Scenic Rivers

There are no national wildlife refuges, national parks, state parks or Wild or Scenic Rivers located within 5 miles of the BM facility.

Terrestrial Resources

The terrestrial resources include the geology, hydrogeology and soil at the facility and in the adjacent area. As the proposed action will be performed on-site in previously developed and disturbed areas and without disturbance to the land surface other than those associated with typical facility operations, these resources will not be affected by implementation of the proposed action. A brief discussion of these resources is provided below for completeness only.

Geology and Hydrogeology

The regional surficial geology of the facility vicinity is mapped as Cenozoic age, quaternary alluvium[32]. The complete sequence of unconsolidated rock materials overlying the dome ranges from Holocene (Recent) to Pleistocene in age. The younger deposits consist of marine clays, silts, and fine-grained sands[33] and are underlain by cyclic and progressively older depositional sequences consisting of clays and silts to coarse-grained sands and gravels characteristic of coastal depositional environments. The BM facility itself is described as an elongated topographic high surrounded by low-lying brackish marshland and coastal prairie[33]. The subsurface strata generally consists of organic clays or silts from ground surface to a maximum of 1.2 meters (m) [4 feet (ft)] below ground surface (bgs), brown/red and grey silty clays, clayey silts, silty sands, and thin stringers of fine sand to approximately 7.62 m (25 ft), a relatively well sorted fine-grained sand from 7.3 to 8.5 m bgs (24 to 28 ft), and a brown silty sand, a grey clay, a grey clayey silt, and another brown silty sand from 8.5 to 15.2 m bgs (28 to 50 ft)[33].

The Evangeline and Chicot aquifers are the only two hydrologic units providing potable water to the BM area[33]. The Evangeline Aquifer is about 365.8 m (1,200 ft) thick in ******* ********** and includes the Goliad Sand and sands in the upper part of the Fleming Formation[31]. The Chicot aquifer consists of the Willis Sand, the Bentley Formation, the Montgomery Formation, the Beaumont Clay, Holocene alluvium (Upper unit) and all of the Lissie sands (Lower unit)[33]. Limited areas containing fresh water are reported only in the upper 30.5 m (100 ft) of the Chicot Aquifer on the top of the dome[33].

On-site, ground water is first encountered in a silty sand or silty clay at 12 to 15 ft bgs[33]. This zone extends to approximately 7.6 to 9.2 m bgs (25 to 30 ft), averaging 4.6 m (15 ft) thick[33]. This shallow ground water is under unconfined to partially confined conditions with a ground water flow direction consistent with the site topography, north-northwest[33]. A deeper underlying saturated zone is represented by a silty sand occurring between 12.2m and 15.2 m bgs (40 ft and 50 ft bgs) and averaging 3.0 (10 ft) in thickness[33]. This ground water exists under confined and/or semi-confined conditions, separated from the shallow zone by 3.0 to 6.1 m (10 to 20 ft) of relatively impermeable grey clay and clayey silt, with a predominant ground water flow direction consistent with the easterly regional ground water flow, primarily north-northeast to east[33].

Soils

A soil series represents mappable soil units with similar colors, textures, structure, and mineral/chemical composition within their profiles (soil layers). The soils within the facility boundaries have been disturbed since site development and, therefore, may not accurately reflect the native soil series in [redacted]. The native soil series identified in [redacted], TX include the following: [redacted], Surfside, [redacted], Follet, Tracosa and Tatlum[34]. These soils are described as slightly to moderately alkaline and saline and/or loamy to clayey. The soil series identified range from moderately well drained to very poorly drained[35].

Water Resources and Water Quality

Water resources include surface water bodies at the facility and in the adjacent area. Subsurface water sources were addressed above. As the proposed action will be performed on-site without disturbance to surface waterbodies other than associated with typical facility operations such as disposal of brine in accordance with the facility National Pollutant Discharge Elimination System permit (NPDES TX0074012) such as the Gulf of Mexico (GOM), it is unlikely that these resources will be affected by implementation of the proposed action. A discussion of these resources is below for completeness only.

Water Resources

The principal streams flowing through [redacted] County into the GOM in the vicinity of the BM facility include the [redacted] and [redacted] rivers[36]. The BM facility itself is bordered by three major surface water bodies classified by the State of TX: the [redacted] River Diversion Channel (the Channel), the [redacted] River, and the ICW[19,20,21]. The facility is located between the Channel and the ICW in an area protected by a man-made levee system. Several unclassified small lakes and reservoirs exist within the triangular region delineated by the levee system. Others, including [redacted] and [redacted] lakes, are outside the levees. Also, within the facility boundaries, there are unclassified, unnamed surface water bodies that are part of the stormwater drainage system and larger named surface water bodies such as [redacted] Lake, [redacted] Lake, and the Holding Pond. Figure B-1 shows the major water bodies near the facility.

Water Quality

Only classified water bodies are subject to monitoring by the State of TX for water quality. Thus, unclassified waterbodies such as [redacted] Lake, [redacted] Lake, [redacted] Lake, [redacted] Lake, and the Holding Pond will not be discussed with regard to water quality or support of designated use. These waterbodies are, however, affected by discharge from the BM facility. The facility is permitted by the Environmental Protection Agency (NPDES TX 0074012) and the Railroad Commission of TX (UHS-004) for discharge via a total of six named outfalls, three of wastewater and three of stormwater, to the following receiving waters: the GOM, [redacted] Lake, [redacted] Lake, [redacted] Lake, and the

********* River Diversion Channel. Monitoring of these outfalls is required by each of these permits to preserve the water quality of the receiving waterbodies.

Relative to classified waterbodies, only one water body near the BM facility has been listed for failing to support its classification, the GOM. The GOM is classified for contact recreation, general use, overall use, fish consumption and aquatic life use from the shoreline to the limit of Texas jurisdiction [3 marine leagues (9 miles)] between the Sabine Pass and Rio Grande. The segment is impaired, i.e. on the 303(d) list, as data indicates that the quality of the water will not support its designation for fish consumption use and will only partially support its designation for aquatic life use. Other waterbodies including the tidal portion of the ******** River, the tidal portion of the ***** ********** River and the **** ******** River Channel (Tidal) are fully supporting all designated uses that were assessed.

Appendix C

Workover Procedure For Lengthening a Strategic Petroleum Reserve Brine String

Procedure For Lengthening a SPR Brine String

Scope of Generic Procedure

This standard operating procedure (SOP) provides a condensed workover procedure for lengthening a brine string. This information is useful in developing an environmental impact assessment for increasing oil storage capacity by lengthening the existing brine string in several cavern wells at the Bryan Mound facility.

Purpose for Lengthening a Brine String

Lengthening a Strategic Petroleum Reserve (SPR) brine string is a cost-effective technique for increasing oil storage capacity of an existing cavern volume. This is achieved by re-spacing the top joint or two of the brine string so that the new setting depth is no more than fifteen feet above its cavern floor plus a fraction of a foot or so.

SPR Administrative Requirements for Lengthening

DOE approval of a Class One Engineering Change Proposal (ECP) will be required to lower the brine string setting depths. Even if an ECP is not required, an Engineering Change Notice (ECN) must be prepared and processed to reflect planned changes to affected technical baseline documentation. Closeout of the ECN after completion of the workover to lower the brine string also is required.

Typical SPR Cavern Well Brine String Description and Procedure Summary

Every SPR crude oil storage cavern is equipped with a brine string that is suspended from surface wellhead equipment to a setting depth of approximately twenty feet above its floor. A brine string is installed by coupling individual joints of casing. Typically, an SPR brine string comprises 100 to 115 joints of casing, which equates to a length of between 1219.2 meters (m) [4000 feet (ft)] and 1371.6 m (4500 ft). Each casing joint is approximately forty ft in length and the outside diameter is 27.31 centimeters (cm) [10-¾ inches (in)]. The target setting depth ranges between 4.6 m (15 ft) and 7.6 m (25 ft) above the cavern floor.

SPR caverns range in volume from approximately 1.1 million cubic meters (m_3) [7 million barrels (MMB)] to 5.9 million m_3 (37 MMB). The typical SPR cavern is about **** m (***** ft) in height and the diameter ranges from ***** m (*** ft) to ***** m (***** ft). The roof of a typical SPR cavern is located at a subsurface depth of approximately ***** m (***** ft) and the floor is ****** m (***** ft) below ground level inside a salt dome, which contains a multiple number of caverns. The cavern will be de-pressured to 0 psig before the work begins on the wellhead.

DynMcDermott (DM) personnel operate a Department of Energy (DOE) workover rig which is routinely used to remove a brine string from a cavern well and to reinstall it by

coupling or uncoupling one joint of casing at a time. Use of a workover rig is required to lengthen a cavern well brine string. Subcontractor supplied support services and tools are required. Services include de-pressuring equipment, a fractionation tank, hoses, blowout prevention equipment, wireline services, casing handling and testing tools, mobile crane and operator, a casing crew, and a host of small tools, equipment, and services to support the DM workover personnel.

Upon completion of a workover to lengthen a brine string of a cavern well located in the State of Texas, a completion report (Form W-2) must be filed with the Railroad Commission of Texas.

Workover Summary

1. Obtain site required safe work permits. (Work Instruction 001)
2. De-pressure cavern to 0 pounds per square inch (gauge pressure) (psig). (Site depressurization procedures). (Work Instruction 001)
3. Rig up the workover rig and support equipment. (Work Instruction 002)
4. Remove the top section wellhead components. (Work Instruction 002)
5. Install the spherical (Hydril) blowout prevention (BOP) equipment and test it. (Work Instruction 003), Quality Assurance/Quality Control (QA/QC) (Document Review)
6. Pick up a retrievable mechanical bridge plug on a joint of drill pipe and set it in the 27.31 cm (10-¾ inch) suspended casing, at approximately 6.1 m (20 ft) below the Bradenhead flange (BHF), and then test the bridge plug to 300 psi. (Work Instruction 003)
7. Remove the spherical (Hydril) BOP. (Work Instruction 003)
8. Remove the wellhead C-section spool. (Work Instruction 003)
9. Install the blind ram, pipe ram, and spherical (Hydril) BOP's and test the stack. (Work Instruction 003), QA/QC (Document Review)
10. Install work platform over well and complete inspection of the workover rig. (Work Instruction 002)
11. Pull the retrievable mechanical bridge plug out of the well. (Work Instruction 006)
12. Rig up the spear and grapple combination and spear into the 27.31 cm (10-¾ inch) suspended brine string. (Work Instruction 006)
13. Pull the 27.31 cm (10-¾ inch) suspended casing hanger/pup joint combination and remove it from the brine string. (Work Instruction 006)
14. Set the slips around the 27.31 cm (10-¾ inch) suspended casing below the coupling. (Work Instruction 006)
15. Release the grapple and spear combination and lay it down. (Work Instruction I006)
16. Back out and lay down the hanger/pup joint combination and the top two joints of casing. (Work Instruction 006)
17. Select appropriate 27.31 cm (10-¾ inch) joint lengths to reach the target suspended string setting depth of 4.6 m (15 ft) above the cavern floor) and slowly run in the additional 27.31 cm (10-¾ inch) casing. (Work Instruction 006) and (Work Instruction 012)
18. While running the remaining joints of 27.31 cm (10-¾ inch) casing, complete make up using hydraulic tongs.

19. Torque each joint within the range of 837 m-kilograms (kg) [6060 ft-pounds (lbs)] and 1048 m-kg (7580 ft-lbs). (Work Instruction 006)
20. While running each joint, test external circumference of made up coupling with water to 2,160 psig, which is 80% of its collapse pressure, for 90 seconds. (Work Instruction 006)
21. Install new hanger/pup joint combination.
22. Complete make up using hydraulic tongs. Torque hanger joint within the range of 837 m-kgs (6060 ft-lbs) and 1048 m-kgs (7580 ft-lbs).
23. Test external circumference of made up coupling with water to 2160 psig, which is 80% of its collapse pressure, for 90 seconds.
24. Pick up a spear and grapple combination and spear into the 27.31 cm (10-¾ inch) casing string. (Work Instruction 006)
25. Land the 27.31 cm (10-¾ inch) suspended casing hanger in the bowl of the wellhead B-section spool. (Work Instruction 006)
26. Release and lay down the grapple and spear. (Work Instruction 006)
27. Rig down and release hydraulic tongs and external testing equipment and operators.
28. Pick up a retrievable mechanical bridge plug on a joint of drill pipe and set bridge plug inside the 27.31 cm (10-¾ inch) suspended casing, at approximately 6.1 m (20 ft) below the BHF. (Work Instruction 006)
29. Test bridge plug to 300 psi. (Work Instruction 006)
30. Remove the BOP stack. (Work Instruction 006)
31. Re-install C-section standard wellhead component with valves attached. (Work Instruction 006)
32. Pressure test the 27.31 cm (10-¾ inch) suspended casing hanger seals at 80% of collapse pressure or 2,000 psi, whichever is less, for 10 minutes, allowing no loss of pressure. (Work Instruction 006), QA/QC (Document Review)
33. Install the spherical (Hydril) preventer on the crown valve and test. (Work Instruction 006), QA/QC (Document Review)
34. Test C-section standard wellhead component with water to 700 psig for 10 minutes. (Work Instruction 006)
35. Equalize the pressure and pull the retrievable mechanical bridge plug out of the well. (Work Instruction 006)
36. Remove the spherical (Hydril) preventer. (Work Instruction 006)
37. Re-install standard wellhead top section onto the crown valve. (Work Instruction 006)
38. Rig down the workover rig. (Work Instruction 006)
39. Move off wellpad. The workover is complete. (Work Instruction 006)

Appendix D

Wellhead Severance Calculations For Cavern 112

Wellhead Severance Calculations For Cavern 112

FACILITY	CAVERN	PRESSURE RATE bbl/psi	MAX PRESSURE psi	OIL SLICK ID in	LENGTH feet	MAX STREAM HEIGHT feet	DURATION hours	VOLUME LOST bbl
BM	112	68	745	15.11	1979	91	1.6	50,664

Notes:

BM = Bryan Mound
Bbl/psi – barrels per pound per square inch
psi = pounds per square inch
ID = inside diameter
In = inches
bbl = barrels

Premise for cavern oil loss calculations:

The wellhead has been instantaneously removed from the oil slick hole, forcing a fluid stream out of the cavern.

Appendix E

Calculations for Pipeline Oil Spill Accident Analysis

Calculations for Pipeline Oil Spill Accident Analysis

Potential Barrels of Oil Spilled as a Result of a Pipeline Accident =

Net loss of hazardous liquids per pipe mile (2003)* x pipe miles to BM

* = Net loss of hazardous liquids per incident (2003) (Barrels) / Liquid Pipeline Pipe Mile (2003) (Miles) = net loss of hazardous liquids per pipe mile

Potential Barrels of Oil Spilled as a Result of a BM Pipeline Accident =

$$\text{Net loss of hazardous liquids per pipe mile (2003)} = \frac{49{,}921 \text{ barrels}^{1}}{160{,}868 \text{ pipe miles}^{2}} = \textit{0.31} \text{ barrels/mile}$$

Potential barrels spilled for BM = *0.31* barrels/mile x 54.2[3] miles = ***16.8*** barrels

Potential barrels spilled per pipe mile for BM during proposed action = 16.8 barrels x 9.5% = 18.4 barrels

Notes –

BM – Bryan Mound

It is important to note that, due to stricter maintenance and control of SPR pipelines, this analysis is performed for conservatism only. Refer to Section 5.1.3 for a discussion of the SPR pipeline maintenance programs.

1. Office of Pipeline Safety, Hazardous Liquid Pipeline Operators Accident Summary Statistics By Year, 1/1/86 to 12/31/2003, www.ops.dot.gov/stats/lq_sum.htm.
2. Office of Pipeline Safety, Liquid Pipeline Operator Total National Mileage, www.ops.dot.gov/stats/lpo.htm.
3. Strategic Petroleum Reserve, Pipeline Inspection History, 12/31/2003.

Appendix F

Wildlife in ********** County

Wildlife
********** County, Texas[28,29,30]

Salamanders
Ambystoma texanum (Smallmouth Salamander)
Notophthalmus viridescens (Red-spotted Newt)

Frogs and Toads
Acris crepitans (Cricket Frog)
Gastrophryne carolinensis (Eastern Narrowmouth Toad)
Gastrophryne olivacea (Great Plains Narrowmouth Toad)
Hyla cinerea (Green Treefrog)
Hyla squirella (Squirrel Treefrog)
Hyla versicolor (Gray Treefrog)
Pseudacris clarki (Spotted Chorus Frog)
Pseudacris crucifer (Spring Peeper)
Pseudacris triseriata (Striped Chorus Frog)
Rana catesbeiana (Bullfrog)
Rana clamitans (Green Frog)
Rana sphenocephala (Southern Leopard Frog)

Crocodilians
Alligator mississippiensis (American Alligator)

Turtles
Caretta caretta (Loggerhead)
Chelydra serpentina (Snapping Turtle)
Deirochelys reticularia (Chicken Turtle)
Dermochelys coriacea (Leatherback)
Kinosternon flavescens (Yellow Mud Turtle)
Kinosternon odoratum (Stinkpot)
Kinosternon subrubrum (Eastern Mud Turtle)
Lepidochelys kempi (Atlantic Ridley)
Terrapene carolina (Eastern Box Turtle)
Terrapene ornata (Ornate Box Turtle)
Trachemys scripta (Slider)

Lizards
Anolis carolinensis (Green Anole)
Cnemidophorus sexlineatus (Six-lined Racerunner)
Eumeces fasciatus (Five-lined Skink)
Eumeces septentionalis (Northern Prairie Skink)

*Hemidactylus turcicus** (Mediterranean Gecko)
Ophisaurus attenuatus (Slender Glass Lizard)
Phrynosoma cornutum (Texas Horned Lizard)
Scincella lateralis (Ground Skink)

Snakes
Agkistrodon contortrix (Copperhead)
Agkistrodon piscivorus (Cottonmouth
Arizona elegans (Eastern Glossy Snake)
Coluber constrictor (Eastern Racer)
Crotalus atrox (Western Diamondback Rattlesnake)
Elaphe obsoleta (Eastern Rat Snake)
Farancia abacura (Mud Snake)
Heterodon platirhinos (Eastern Hognose Snake)
Hypsiglena torquata (Night Snake)
Lampropeltis calligaster (Prairie Kingsnake)
Lampropeltis getula (Common Kingsnake)
Masticophis flagellum (Coachwhip)
Micrurus fulvius (Eastern Coral Snake)
Nerodia cyclopion (Mississippi Green Water Snake)
Nerodia erythrogaster (Plainbelly Water Snake)
Nerodia fasciata (Southern Water Snake)
Nerodia rhombifer (Diamondback Water Snake)
Opheodrys aestivus (Rough Green Snake)
Regina grahami (Graham's Crayfish Snake)
Sistrurus miliarius (Pygmy Rattlesnake)
Storeria dekayi (Brown Snake)
Thamnophis proximus (Western Ribbon Snake)
Thamnophis sirtalis (Common Garter Snake)
Virginia striatula (Rough Earth Snake)

Mammals
Didelphis virginiana (Virginia Opossum)
Lasiurus borealis (Eastern Red Bat)
Tadarida brasiliensis (Brazilian Free-tailed Bat)
Sylvilagus floridanus (Eastern Cottontail)
Lepus californicus (Black-tailed Jackrabbit)
Castor Canadensis (American Beaver)
Reithrodontomys fulvescens (Fulvous Harvest Mouse)
Peromyscus leucopus (White-footed Mouse)
Sigmodon hispidus (Hispid Cotton Rat)
Canis latrans (Coyote)
Urocyon cinereoargenteus (Common Gray Fox)
Bassariscus astutus (Ringtail)
Procyon lotor (Common Raccoon)
Mephitis mephitis (Striped Skunk)

Lynx rufus (Bobcat)
Odocoileus virginianus (White-tailed Deer)
Lasiurus seminolus (Seminole Bat)
Sylvilagus aquaticus (Swamp Rabbit)
Sciurus carolinensis (Eastern Gray Squirrel)
Glaucomys volans (Eastern Flying Squirrel)
Oryzomys palustris (Marsh Rice Rat)
Reithrodontomys humulis (Eastern Harvest Mouse)
Lutra Canadensis (River Otter)
Pipistrellus subflavus (Eastern Pipistrelle)
Lasiurus intermedius (Northern Yellow Bat)
Nycticeius humeralis (Evening Bat)
Sciurus niger (Eastern Fox Squirrel)
Baiomys taylori (Northern Pygmy Mouse)
Canis rufus (Red Wolf)
Mustela vison (Mink)
Spilogale putorius (Eastern Spotted Skunk)
Geomys attwateri (unique to Texas -Rodent)
Geomys personatus (unique to Texas -Rodent)
Geomys texensis (unique to Texas -Rodent)

Birds

LOONS
Common Loon

GREBES
Pied-billed Grebe
Horned Grebe
Eared Grebe

PELICANS
American White Pelican
Brown Pelican

CORMORANTS
Double-crested Cormorant
Olivaceous Cormorant

DARTERS
Anhinga

FRIGATEBIRDS
Magnificent Frigatebird

BITTERNS & HERONS
American Bittern
Least Bittern
Great Blue Heron
Great Egret
Snowy Egret
Little Blue Heron
Tricolored Heron
Reddish Egret
Cattle Egret
Green Heron
Black-crowned Night-Heron
Yellow-crowned Night-Heron

IBISES & STORKS
White Ibis
White-faced Ibis
Roseate Spoonbill
Wood Stork

SWANS, GEESE & DUCKS
Fulvous Whistling-Duck
Black-bellied Whistling-Duck
Greater White-fronted Goose
Snow Goose
Ross' Goose
Canada Goose
Wood Duck
Green-winged Teal
American Black Duck
Mallard
Northern Pintail
Blue-winged Teal
Cinnamon Teal
Northern Shoveler
Gadwall
American Wigeon
Canvasback
Redhead
Ring-necked Duck
Greater Scaup
Lesser Scaup
White-winged Scoter
Common Goldeneye
Bufflehead
Hooded Merganser

Red-breasted Merganser
Ruddy Duck
Masked Duck

AMERICAN VULTURES
Black Vulture
Turkey Vulture

KITES, EAGLES & HAWKS
Osprey
American Swallow-tailed Kite
White-tailed Kite
Mississippi Kite
BALD EAGLE
Northern Harrier (Marsh Hawk)
Sharp-shinned Hawk
Cooper's Hawk
Red-shouldered Hawk
Broad-winged Hawk
Swainson's Hawk
White-tailed Hawk
Red-tailed Hawk
Rough-legged Hawk

CARACARAS & FALCONS
Crested Caracara
American Kestrel
Merlin
Peregrine Falcon

PHEASANTS, TURKEYS & QUAIL
Northern Bobwhite

RAILS, GALLINULES & COOTS
Yellow Rail
Black Rail
Clapper Rail
King Rail
Virginia Rail
Sora
Purple Gallinule
Common Moorhen
American Coot

CRANES
Sandhill Crane
Whooping Crane

PLOVERS & OYSTERCATCHERS
Black-bellied Plover
American Golden Plover (Lesser Gol-Pl.)
Snowy Plover
Wilson's Plover
Semipalmated Plover
Piping Plover
Killdeer
American Oystercatcher
Mountain Plover

SANDPIPERS & PHALAROPES
Black-necked Stilt
American Avocet
Greater Yellowlegs
Lesser Yellowlegs
Solitary Sandpiper
Willet
Spotted Sandpiper
Upland Sandpiper
Whimbrel
Long-billed Curlew
Marbled Godwit
Hudsonian Godwit
Ruddy Turnstone
Red Knot
Sanderling
Semipalmated Sandpiper
Western Sandpiper
Least Sandpiper
White-rumped Sandpiper
Baird's Sandpiper
Pectoral Sandpiper
Dunlin
Stilt Sandpiper
Buff-breasted Sandpiper
Short-billed Dowitcher
Long-billed Dowitcher
Common Snipe
Wilson's Phalarope

GULLS & TERNS
Laughing Gull
Franklin's Gull
Bonaparte's Gull
Ring-billed Gull
Herring Gull
Gull-billed Tern
Caspian Tern
Royal Tern
Sandwich Tern
Common Tern
Forster's Tern
Least Tern
Black Tern
Black Skimmer

PIGEONS & DOVES
White-winged Dove
Mourning Dove
Common Ground-Dove
Rock Dove

CUCKOOS & ANIS
Black-billed Cuckoo
Yellow-billed Cuckoo
Groove-billed Ani

BARN OWLS
Barn Owl

TYPICAL OWLS
Great Horned Owl
Burrowing Owl
Barred Owl
Short-eared Owl

GOATSUCKERS
Lesser Nighthawk
Common Nighthawk
Chuck-will's-widow
Whip-poor-will

SWIFTS
Chimney Swift

HUMMINGBIRDS
Ruby-throated Hummingbird

KINGFISHERS
Belted Kingfisher

WOODPECKERS
Red-headed Woodpecker
Red-bellied Woodpecker
Yellow-bellied Sapsucker
Downy Woodpecker
Northern Flicker (Common Flicker)
Pileated Woodpecker

TYRANT FLYCATCHERS
Olive-sided Flycatcher
Eastern Wood-Pewee
Empidonax Sp.
Eastern Phoebe
Vermilion Flycatcher
Great Crested Flycatcher
Ash-throated Flycatcher
Western Kingbird
Eastern Kingbird
Scissor-tailed Flycatcher

LARKS
Horned Lark

SWALLOWS
Purple Martin
Tree Swallow
Northern Rough-winged Swallow
Bank Swallow
Cliff Swallow
Barn Swallow

JAYS, MAGPIES & CROWS
Blue Jay
American Crow

CHICKADEES & TITMICE
Carolina Chickadee
Tufted Titmouse

CREEPERS
Brown Creeper

WRENS
Carolina Wren
House Wren
Marsh Wren
Sedge Wren

KINGLETS & GNATCATCHERS
Golden-crowned Kinglet
Ruby-crowned Kinglet
Blue-gray Gnatcatcher

THRUSHES
Eastern Bluebird
Veery
Gray-cheeked Thrush
Swainson's Thrush
Hermit Thrush
Wood Thrush
American Robin

MOCKINGBIRDS & THRASHERS
Gray Catbird
Northern Mockingbird*
Brown Thrasher
Sage Thrasher

PIPITS
American Pipit (Water Pipit)
Sprague's Pipit

WAXWINGS
Cedar Waxwing

SHRIKES
Loggerhead Shrike

STARLINGS
European Starling

VIREOS
White-eyed Vireo
Solitary Vireo
Yellow-throated Vireo

Warbling Vireo
Philadelphia Vireo
Red-eyed Vireo

WOOD-WARBLERS
Blue-winged Warbler
Golden-winged Warbler
Tennessee Warbler
Orange-crowned Warbler
Nashville Warbler
Northern Parula
Yellow Warbler
Chestnut-sided Warbler
Magnolia Warbler
Yellow-rumped Warbler
Black-throated Green Warbler
Blackburnian Warbler
Yellow-throated Warbler
Palm Warbler
Bay-breasted Warbler
Blackpoll Warbler
Cerulean Warbler
Black-and-white Warbler
American Redstart
Prothonotary Warbler
Worm-eating Warbler
Ovenbird
Northern Waterthrush
Louisiana Waterthrush
Kentucky Warbler
Common Yellowthroat
Hooded Warbler
Wilson's Warbler
Canada Warbler
Yellow-breasted Chat

TANAGERS
Summer Tanager
Scarlet Tanager

CARDINALS & GROSBEAKS
Northern Cardinal
Rose-breasted Grosbeak
Blue Grosbeak
Indigo Bunting
Painted Bunting

Dickcissel

SPARROWS
Field Sparrow
Vesper Sparrow
Lark Sparrow
Savannah Sparrow
Grasshopper Sparrow
Le Conte's Sparrow
Sharp-tailed Sparrow
Seaside Sparrow
Fox Sparrow
Song Sparrow
Lincoln's Sparrow
Swamp Sparrow
White-throated Sparrow
Dark-eyed Junco

BLACKBIRDS & ORIOLES
Bobolink
Red-winged Blackbird
Eastern Meadowlark
Yellow-headed Blackbird
Brewer's Blackbird
Great-tailed Grackle
Boat-tailed Grackle
Common Grackle
Brown-headed Cowbird
Orchard Oriole
Northern Oriole

FINCHES
American Goldfinch

OLD WORLD SPARROWS
House Sparrow

ACCIDENTALS
Tundra Swan
Ferruginous Hawk
Ladder-backed Woodpecker
Winter Wren
Chipping Sparrow
Henslow's Sparrow
Dark-eyed Junco (Oregon)
Northern Oriole (Bullock's)
Red-tailed Hawk (Harlan's)
Inca Dove
Say's Phoebe
Pyrrhuloxia
Clay-colored Sparrow
White-crowned Sparrow
Rusty Blackbird
Scott's Oriole

Purple Finch Pine Siskin
Lesser Goldfinch Bewick's Wren

References:

Texas A&M University, 1998.

U.S. Fish and Wildlife Service. No date. Birds of **********/ *** ********/*** *********. National Wildlife Refuges. U.S. Fish and Wildlife Service. Unpaginated. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. http://www.npwrc.usgs.gov/resource/othrdata/chekbird/r2/**********.htm (Version 22MAY98).

Appendix G

Endangered and/or Threatened Species in ********** County

Threatened or Endangered Species
********* County, Texas[31]

BIRDS	Federal Status	State Status
American Peregrine Falcon (*Falco peregrinus anatum*)	DL	E
Arctic Peregrine Falcon (*Falco peregrinus tundrius*)	DL	T
Attwater's Greater Prairie-chicken (*Tympanuchus cupido attwateri*)	LE	E
Bald Eagle (*Haliaeetus leucocephalus*)	LT-PDL	T
Black Rail (*Laterallus jamaicensis*)	NA	NA
Brown Pelican (*Pelecanus occidentalis*)	LE	E
Henslow's Sparrow (*Ammodramus henslowii*)	NA	NA
Mountain Plover (*Charadrius montanus*)	NA	NA
Piping Plover (*Charadrius melodus*)	LT	T
Reddish Egret (*Egretta rufescens*)	NA	T
Snowy Plover (*Charadrius alexandrinus*)	NA	NA
Sooty Tern (Sterna fuscata)	**NA**	**T**
Swallow-tailed Kite (*Elanoides forficatus*)	NA	T
White-faced Ibis (*Plegadis chihi*)	NA	T
White-tailed Hawk (*Buteo albicaudatus*)	NA	T
Whooping Crane *(Grus americana*)	LE	E
Wood Stork (*Mycteria americana*)	NA	T

BIRD RELATED AREAS	Federal Status	State Status
Colonial waterbird nesting areas	NA	NA
Migratory songbird fallout areas	NA	NA

MAMMALS	Federal Status	State Status
Black Bear (*Ursus americanus*)	T/SA; NL	T
Jaguarundi (*Herpailurus yaguarondi*)	LE	E
Louisiana Black Bear (*Ursus americanus luteolus*)	LT	T
Ocelot (*Leopardus pardalis*)	LE	E
Plains Spotted Skunk (*Spilogale putorius interrupta*)	NA	NA
West Indian Manatee (*Trichechus manatus*)	LE	E

REPTILES	Federal Status	State Status
Atlantic Hawksbill Sea Turtle *(Eretmochelys imbricata*)	LE	E
Green Sea Turtle *(Chelonia mydas*)	LT	T
Gulf Saltmarsh Snake (*Nerodia clarkii*)	LE	T
Kemp's Ridley Sea Turtle *(Lepidochelys kempii*)	LE	E
Leatherback Sea Turtle *(Dermochelys coriacea*)	LE	E
Loggerhead Sea Turtle *(Caretta caretta*)	LT	T
Smooth Green Snake (*Liochlorophis vernalis*)	NA	T
Texas Diamondback Terrapin (*Malaclemys terrapin littoralis*)	NA	NA
Texas Horned Lizard (*Phrynosoma cornutum*)	NA	T
Timber/Canebrake Rattlesnake (*Crotalus horridus*)	NA	T

VASCULAR PLANTS	**Federal Status**	**State Status**
Coastal gay-feather *(Liatris bracteata*)	NA	NA
Texas windmill-grass (*Chloris texensis*)	NA	NA
Threeflower broomweed *(Thurovia triflora*)	NA	NA

Status Key:

LE,LT - Federally Listed Endangered/Threatened
PE,PT - Federally Proposed Endangered/Threatened
E/SA,T/SA - Federally Endangered/Threatened by Similarity of Appearance
C1 - Federal Candidate, Category 1; information supports proposing to list as endangered/threatened
DL,PDL - Federally Delisted/Proposed for Delisting
NL - Not Federally Listed
E,T - State Endangered/Threatened
NA - Rare, but with no regulatory listing status

ATTACHMENT B
MITIGATION ACTION PLAN

DOE/SPR/EA-1505-MAP

Mitigation Action Plan for the Project to Increase the Facility Capacity and Inventory at the Bryan Mound Storage Facility

U.S. Department of Energy

Strategic Petroleum Reserve

900 Commerce Road East

New Orleans, Louisiana 70123

November 2004

Table of Contents

Introduction

The crude oil (oil) currently stored by the Strategic Petroleum Reserve (SPR) in salt caverns along the Louisiana (LA) and Texas (TX) Gulf Coast serves to offset the effects of a significant oil supply interruption. Due to the location of these reserves, oil can be distributed through interstate pipelines to nearly half of the Nation's oil refineries or transported via barge /ship to more remote refineries. Currently, the SPR includes four Gulf Coast underground salt dome oil storage facilities in LA and TX and a project management facility in LA. The history of the SPR, a general description of the Bryan Mound (BM) storage facility (facility) and the proposed action is provided below.

History and Background

The creation of the SPR was mandated by Congress as part of the Energy Policy and Conservation Act (EPCA) on December 22, 1975. The objective of the SPR is to provide the United States with oil should a supply disruption occur. It is anticipated the SPR's **** million cubic meters (m^3) [**** million barrels (MMB)] capacity will be reached by 2005. Of the four SPR oil storage facilities in LA and TX, the BM facility is the facility at which the proposed action will occur.

The BM facility is located in ********* County, TX, on the ******* River Diversion Channel. The BM facility occupies 500 acres and almost encompasses the entire BM salt dome. Development of the facility was initiated in 1977 and operations commenced in 1979. The facility has ** underground solution-mined storage caverns with a combined storage capacity of ******* million m^3 (***** MMB) of oil and the capability to drawdown and deliver oil at a rate of **** MMB per day. A site map is provided as Figure 1-2 in environmental assessment (EA), DOE/EA-1505, which was prepared to evaluate the potential environmental impacts associated with the proposed action.

Consistent with the original maximum storage capacity designation and EPCA, the Department of Energy (DOE) is proposing activities to increase storage capacity and, upon Administration authorization, petroleum inventory at the BM facility by 3.5 million m^3 (22 MMB). Under the proposed action, there are two distinct actions, the action to increase the facility capacity and the action to increase the facility's petroleum inventory. A portion of the proposed increase in facility capacity would be obtained by modifying the existing internal cavern infrastructure in 10 caverns (caverns 4, 5,105, 106, 108, 109, 110, 114, 115, and 116) via cavern workovers [1.4 Million m^3 (8.8 MMB)]. The balance of the proposed increase to facility capacity, 2.1 million m^3 (13.2 MMB), would result from administrative activities, i.e. permitting, only. These include the return of cavern 112 to service at its full capacity [**** million m^3 (** MMB)] and volume upgrades of 0.19 million m^3 (1.2 MMB) based on new information obtained during sonar investigation of caverns 2, 113, 101, 102, 103, 104, 107, and 111. The final action associated with implementation of the proposed action is to increase facility inventory by 3.5 million m^3 (22 MMB) of oil. This final action will only commence upon the express authorization of the Administration.

During analysis of the proposed action in DOE/EA-1505, it was determined that mitigation of impacts to ambient air resulting from emission of volatile organic compounds (VOC) was

necessary if the BM facility were to remain a minor source of air emissions. Based on classification of the BM facility as a minor source, actual emissions of VOC resulting from all actions associated with the proposed action cannot exceed 3.23 tons per year (TPY). Preliminary calculations of VOC emissions indicate that emissions for the proposed action will exceed this threshold if the proposed action proceeds on the proposed four year schedule.

It is the intent of the DOE to conduct all activities associated with increasing facility capacity (workovers) and petroleum inventory (future fill) without altering the classification of the facility as a "minor source" of air emissions. A brief description of the intended mitigation activities was provided in the EA (Section 5.2). The details are provided in the following sections of this Mitigation Action Plan (MAP).

Mitigation Commitments

Mitigation activities considered and evaluated included vapor recovery coupled with the use of a flare, vapor recovery coupled with the use of an activated carbon filter system and use of a closed containment system to prevent exposure of VOCs to the environment (two options, use of a bladder tank and de-pressuring to BM site oil tanks). Initially, vapor recovery coupled with the use of a flare was determined to be preferable on both an environmental and cost basis and was selected to be the primary mitigation activity. However, the use of a closed containment system by routing of oil to site floating roof tanks was determined to be feasible and became the preferred primary mitigation activity on both an environmental and cost basis.

In general, the overall characteristics of the closed containment system make it a superior mitigation activity. Specifically, the use of the closed containment system requires only a minor modification to existing procedures and equipment, which greatly decreases the cost of implementation, while preventing VOC emissions from oil transfers during workovers. In the unlikely event that this preferred primary mitigation activity could not be utilized, the alternate mitigation activity, vapor recovery coupled with use of a flare would be considered, so both are described in this section and the subsequent section of this MAP.

Regardless of the preferred primary mitigation activity utilized, mitigation activities in general for the proposed action will be twofold. In the field, these activities will likely be comprised of use of a closed containment system to route oil displaced during cavern workovers to the BM site oil tanks, mitigating VOC emissions by preventing exposure of VOC emissions to the environment during workover activities. As well, administratively, scheduling of specific activities will be employed to reduce impact to air quality from VOC emissions in any given year.

The closed containment system that was ultimately chosen as the preferred method to mitigate VOC emissions is comprised of utilization of a centrifugal pump to transfer the oil displaced during depressurization to the BM site oil tanks. This temporary pumping system will pump oil into the normal site oil fluid transfer headers, which will be used to route oil into the BM site oil tanks. Based on total displacement of approximately 75,000 barrels of oil during implementation of the proposed action, additional VOC emissions from the BM site oil tanks are estimated to be minimal, approximately 0.36 metric tons (mtons) (0.4 tons). Refer to Table 5-3 of the EA for the estimated additional VOC emissions from the BM site oil tanks

when mitigation activities comprised of a closed containment system are initiated. This is due to the cooling of the oil as it enters the tank.

If tank lineup is not available, the same closed system with centrifugal pumps in series and a positive displacement pump will be utilized. However, this temporary pumping system will pump oil into the same site oil transfer headers, which will then route oil directly to another cavern. No emissions are anticipated to result from this option.

A fractionation (frac) tank will be available in the closed containment system only for wellhead overflow and pressure relief valve discharge. Oil will only be routed to a frac tank to prevent spillage in the event of an unanticipated system back pressure. Since the only modification to the normal workover configuration is the use of a frac tank bypass line as the primary fluid movement route, this presents no new environmental aspects and/or impacts.

The flaring system that was initially chosen as the preferred method to mitigate VOC emissions is now the preferred alternative for mitigation of VOCs. It is comprised of a trailer-mounted flare sited off the wellpad for the cavern being worked over that can handle five to eight million standard cubic feet per day with 98% VOC destruction. Refer to Table 5-4 of the EA for the estimated VOC emissions per workover by cavern when mitigation activities comprised of a vapor recovery system coupled with use of a flare are initiated. These estimated VOC emissions are approximately 0.07 mtons (0.08 tons) with negligible nitrogen oxide and carbon monoxide production (Refer to Table 5-5 of the EA). The vapor recovery and flaring system would include the flare stack and associated support equipment such as a non-sparking blower with diesel engine, a bi-directional API- and USCG-accepted detonation arrestor and a propane or natural gas pilot. Process safety devices that are anticipated include a flame arrestor on the gas outlet of the frac tank and a nitrogen purge on the frac tank. Determination of potential hazards associated with the final design of this system would be required prior to implementation to ensure worker health and safety and environmental risks.

As stated previously, scheduling will also be employed to mitigate the impacts to air quality as a result of VOC emissions. The permitted emissions for the BM facility are based on the calendar year. Thus, activities associated with the proposed action may be scheduled to occur over more than one calendar year to assist with remaining in compliance with the site air quality permit and the proposed project schedule. The logistics and scheduling of the distinct activities of the proposed action, i.e. workovers and fill, will be coordinated with environmental personnel to ensure that there is the requisite awareness of air quality and permit limitations for VOC emissions. Moreover, activities at the facility will be performed with similar awareness of the potential impacts to air quality and permit compliance issues in an effort to reduce the environmental impacts of the proposed action and maintain compliance.

Mitigation Action Plan Implementation And Reporting

The management and operations contractor shall secure all necessary permits to implement mitigation activities as required by applicable Federal, State, and local environmental laws, orders, and regulations. Any mitigation conditions set forth in permits issued for the project and/or MAP will be complied with for the duration of the proposed action. The SPR will use existing organizational and administrative controls to gather and report information regarding

implementation and status of mitigation actions. Such controls include applicable review and reporting systems, inspections, etc.

The closed containment system process will be covered by existing environmental and safety and health controls as it represents only a minor modification to the existing workover configuration. Prior to the implementation of the closed containment system, a specific fluid movement plan for this mitigation activity will, however, be developed and approved at the BM facility. Reporting requirements will be satisfied by reporting all emissions associated with implementation of the proposed action from the BM site oil tanks to the Texas Commission on Environmental Quality (TCEQ) in the annual Emission Inventory Questionnaire (EIQ). These emissions are estimations derived via calculations based on EPA factors (AP-42) and recordation of fluid movements associated with the proposed action's workovers.

Should the vapor recovery option be designated as the preferred primary mitigation activity at a later date, the extensive SPR design review process will be employed during design of the flaring system to ensure that all potential aspects and impacts of the flare design and operation are recognized and addressed prior to implementation. A Hazard and Operability (HAZOP) analysis on the flaring system will also be conducted under OSHA process safety management to ensure the safety integrity of the designed process and mitigation of environmental upsets. Additionally, a readiness review board (RRB) will be conducted prior to commencement of the proposed action as a final evaluation of the potential aspects and impacts of operating the flaring system, serving to ensure that all necessary training on the safe and environmentally correct operation of the flaring system and procedures such as operating procedures inclusive of the results of the hazard review and the vendor/manufacturer's operating and safety information have been completed prior to operation of the flaring system. Site operators and other personnel would, in cooperation with New Orleans environmental and engineering personnel, implement the flaring system in accordance with the established design and operating procedures during cavern de-pressuring and workovers associated with the proposed action. Finally, reporting requirements would be satisfied by reporting all flare emissions to the TCEQ in the annual EIQ. These emissions are estimations derived via calculations based on EPA factors (AP-42), vendor certification of the destruction efficiency of the flaring system, and recordation of fluid movements associated with the proposed action's workovers.

Upon implementation of any mitigation activity, the SPR will report all mitigation results in its Annual Site Environmental Report (ASER) published by October 1 of each year in accordance with Section 5.d.(11)(f) of DOE Order 451.1B, the National Environmental Policy Act Compliance Program. Additionally, new information and/or changed circumstances should also be reflected in this annual report along with any major changes to the mitigation activities included in this MAP, if necessary. These changes will then be incorporated in either an updated MAP or other procedure. When mitigation actions are completed, the information will be included in the ASER.