U.S. DEPARTMENT OF ENERGY

STRATEGIC PETROLEUM RESERVE
PROJECT MANAGEMENT OFFICE
NEW ORLEANS, LOUISIANA

Site Environmental Report
For
Calendar Year 2012

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STRATEGIC PETROLEUM RESERVE

SITE ENVIRONMENTAL REPORT

FOR

CALENDAR YEAR 2012

Document No. AAA9020.569
Version 1.0

Prepared for the U. S. Department of Energy
Strategic Petroleum Reserve Project Management Office
under Contract No. DE-AC96-93PO92207

DM Petroleum Operations Company
850 South Clearview Parkway
New Orleans, Louisiana 70123

Malcolm Baldrige National Quality Award 2005 Award Recipient

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DOE F 1325.8
(8-89)
EFG (07-90)

United States Government **Department of Energy**

memorandum

DATE: OCT 1 2013

REPLY TO ATTN OF: 13-ESH-006
FE-4441 (WWoods)

SUBJECT: SITE ENVIRONMENTAL REPORT FOR 2012 – STRATEGIC PETROLEUM RESERVE

TO: Distribution

Attached for your information is a copy of the Site Environmental Report for Calendar Year 2012 for the U.S. Department of Energy (DOE) Strategic Petroleum Reserve. This report is prepared and published annually for distribution to local, State, and Federal Government agencies, the Congress, the public, and the news media. The report was prepared for DOE by DM Petroleum Operations Company.

To the best of my knowledge, this report accurately summarizes and discusses the results of the 2012 Environmental Monitoring Program.

If you have any question or desire additional information, please contact Rick Shutt of the Project Management Office, Office of Technical Assurance at (504) 734-4339.

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

Attachment

QUESTIONNAIRE/READER COMMENT FORM

Please submit your questions/comments on a photocopy of this page and forward it to the following address:

DM Petroleum Operations Company
Environmental Department, EF-20
850 South Clearview Parkway
New Orleans, LA 70123

A copy of your comments will be sent to the originator for response.

Date: _____

Name of Submitter:_____

Street or P.O. Box: _____

City/State/Zip code: _____

Organization (if applicable): _____

Comments:

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(Attach other sheets as needed)
(for originator's use)

Subject Matter Expert (SME): _____ Date: _____

SME's Response:_____

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_____

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ABBREVIATIONS AND ACRONYMS

A&E	Architect and Engineer
AFFF	Aqueous Film Forming Foam
AGSC	ASRC Gulf States Constructors, LLC
ANAB	ANSI-ASQ National Accreditation Board
ANSI	American National Standards Institute
AP	Affirmative Procurement
APHA	American Public Health Association
ASQ	American Society for Quality
ASRC	Arctic Slope Regional Corporation
ASTM	American Society for Testing and Materials
ATS	Assessment Tracking System
avg	Average
bbl	Barrel (1 bbl = 42 gallons)
BC	Bayou Choctaw
BDL	Below Detectable Limit
BH	Big Hill
BIG	Buy It Green
bls	Below Land Surface
BM	Bryan Mound
BOD5	Five Day Biochemical Oxygen Demand
^{o}C	Degrees Celsius
CAA	Clean Air Act
CAP	Corrective Action Plan
CB	Certification Body
CBT	Computer-Based Training
CEQ	Council for Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CESQG	Conditionally Exempt Small Quantity Generator
CFS	Cubic Feet Per Second
CFR	Code of Federal Regulations
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
COE	United States Army Corps of Engineers
CPG	Comprehensive Procurement Guidelines
CV	Coefficient Of Variation
CWA	Clean Water Act
CY	Calendar Year
DM	DM Petroleum Operations Company
DMR	Discharge Monitoring Report
DO	Dissolved Oxygen
DOE	United States Department of Energy
DOT	United States Department of Transportation
E&P	Exploration and Production
EA	Environmental Assessment
EFCOG	Energy Facility Contractors Group

ABBREVIATIONS AND ACRONYMS (continued)

EFH	East Fillhole
EIQ	Emissions Inventory Questionnaire
EIS	Emissions Inventory Summary
EIS	Environmental Impact Statement
EMP	Environmental Monitoring Plan
EMS	Environmental Management System
EO	Executive Order
EOT	Extension of Time
EPA	United States Environmental Protection Agency
EPACT	Energy Policy Act
EPCRA	Emergency Planning and Community Right-to-Know Act
EPEAT	Electronic Product Environmental Assessment Tool
ERP	Emergency Response Procedure
ERT	Emergency Response Team
ESA	Endangered Species Act
ES&H	Environmental Safety & Health
E-W	East-West
FEMP	Federal Energy Management Program
FFCA	Federal Facilities Compliance Act
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
fps	Feet Per Second
FRP	Facility Response Plan
ft	Feet
ft/yr	Feet Per Year
F&WS	United States Fish and Wildlife Service
FY	Fiscal Year
GALCOE	U.S. Army Corps of Engineers, Galveston District
GHG	Green House Gas
GLO	General Land Office
gpd	Gallons Per Day
GSA	General Services Administration
GWPMP	Ground Water Protection and Management Plan
HAP	Hazardous Air Pollutant
HW	Hazardous Waste
ICW	Intracoastal Waterway
ISM	Integrated Safety Management
ISO	International Organization for Standardization
LA	Louisiana
LAC	Louisiana Administrative Code
lbs	Pounds
LCF	Light Commercial Facility
LCMS	Lake Charles Meter Station
LDEQ	Louisiana Department of Environmental Quality
LDHH	Louisiana Department of Health and Hospitals

ABBREVIATIONS AND ACRONYMS (continued)

LDNR	Louisiana Department of Natural Resources
LPDES	Louisiana Pollutant Discharge Elimination System
m	Meters
m3	Cubic Meters
ml	Milliliters
m/yr	Meters Per Year
max	Maximum
MCL	Maximum Contaminant Levels
MDEQ	Mississippi Department of Environmental Quality
MDR	Maximum Diversion Rate
mg/l	Milligrams Per Liter
mmb	Million Barrels
MPAR	Maintenance Performance Appraisal Report
m/sec	Meters Per Second
M&O	Management & Operating
MS	Mississippi
MSDS	Material Safety Data Sheets
MSGP	Multi-Sector General Permit
mt	Metric Tons
MW	Monitoring Well
N	North
NAAQS	National Ambient Air Quality Standards
NAEP	National Association of Environmental Professionals
NE	Northeast
NEPA	National Environmental Policy Act
NFAATT	No Further Action At This Time
NFRAP	No Further Remedial Action Planned
NHPA	National Historic Preservation Act
NIMS	National Incident Management System
NO	New Orleans
NODCOE	U.S. Army Corps of Engineers, New Orleans District
NOEC	No Observed Effect Concentration
NOI	Notice of Intent
NORM	Naturally Occurring Radioactive Material
NOV	Notice Of Violation
NOx	Nitrogen Oxide
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List (CERCLA)
N-S	North-South
NSR	New Source Review
NW	Northwest
NWP	Nationwide Permit
OCC	Operations Control Center
O&G	Oil And Grease

ABBREVIATIONS AND ACRONYMS (continued)

OPA	Oil Pollution Act of 1990
OSPRA	Oil Spill Prevention and Response Act
OVA	Organic Vapor Analyzer
P2	Pollution Prevention
PCB	Polychlorinated Biphenyl
PE	Performance Evaluation
pH	Negative Logarithm Of The Hydrogen Ion Concentration
PM10	Particulate Matter (less than 10 microns)
PMO	Project Management Office
PPA	Pollution Prevention Act of 1990
PPOA	Pollution Prevention Opportunity Assessment
PPP	Pollution Prevention Plan
ppt	Parts Per Thousand
PREP	Preparedness for Response Exercise Program
PSD	Prevention Of Significant Deterioration
PSI	Pounds Per Square Inch
PVC	Polyvinyl Chloride
PW	Periphery Well
PZ	Piezometer
QC	Quality Control
QPL	Qualified Products List
RAB	Registrar Accreditation Board
RCRA	Resource Conservation and Recovery Act
RCT	Railroad Commission of Texas
REC	Recognized Environmental Concern
RECAP	Risk Evaluation Corrective Action Program
ROD	Record of Decision
RWIS	Raw Water Intake Structure
S	South
SAL	Salinity
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
SE	Southeast
SER	Site Environmental Report
SIC	Standard Industrial Classification
SIP	State Implementation Plan
SO2	Sulfur Dioxide
SOC	Security Operations Center
SPCC	Spill Prevention Control and Countermeasures
SPR	Strategic Petroleum Reserve
SPRPMO	Strategic Petroleum Reserve Project Management Office
SQG	Small Quantity Generator
STP	Sewage Treatment Plant
s.u.	Standard Units

ABBREVIATIONS AND ACRONYMS (continued)

SW	Southwest
SWPPP	Stormwater Pollution Prevention Plan
TCEQ	Texas Commission on Environmental Quality
TCLP	Toxicity Characteristic Leaching Procedure
TDH&PT	Texas Department of Highways and Public Transportation
TDS	Total Dissolved Solids
TNRCC	Texas Natural Resource Conservation Commission
TOC	Total Organic Carbon
TPQ	Threshold Planning Quantity
TPWD	Texas Parks and Wildlife Department
tpy	Tons Per Year
TRI	Toxic Chemical Release Inventory
TSCA	Toxic Substance Control Act
TSD	Treatment Storage Disposal
TSS	Total Suspended Solids
TVP	True Vapor Pressure
TX	Texas
UIC	Underground Injection Control
URS	United Research Services
VOC	Volatile Organic Compound
VWS	Verification Well Study
WCP	Water Conservation Plan
WAD	Work Authorization Directive
W	West
WH	West Hackberry

VERSION HISTORY

Version History AAA9020.569., Site Environmental Report for Calendar Year 2012		
VERSION	DESCRIPTION	EFFECTIVE DATE
1.0	New document.	

Executive Summary

The purpose of the annual U. S. Department of Energy (DOE) Strategic Petroleum Reserve (SPR) Site Environmental Report (SER) is to characterize site environmental management performance, confirm compliance with environmental standards and requirements, and highlight significant programs and efforts performed by DM Petroleum Operations (DM), the management and operations (M&O) contractor. The SER serves the public by summarizing monitoring data collected to assess how the SPR impacts the environment.

The SER provides a balanced synopsis of non-radiological monitoring and regulatory compliance data. It also affirms that the SPR has been operating within acceptable regulatory limits and illustrates the success of SPR efforts toward continual environmental improvement. In 2012, the SPR was the recipient of the DOE Silver GreenBuy Award for achieving excellence in Sustainable Acquisition. Concern for the environment through environmental management and maintaining a high level of environmental stewardship are integrated into daily activities.

During 2012, the SPR was in compliance with all applicable federal and state environmental regulations. There were more than 143 active permits in effect across all SPR sites. From those active permits there were 1278 permit related analyses conducted. There were nine permit non-compliances reported. There were no reportable crude oil or brine spills in 2012. Reportable oil and brine spills have substantially declined over the years. There were also no Clean Air Act (CAA), Clean Water Act (CWA) or Resource Conservation and Recovery Act (RCRA) Notice of Violations (NOV) received in 2012. SPR facilities continue to operate as Conditionally Exempt Small Quantity Generators (CESQG). The Superfund Amendments and Reauthorization Act (SARA) Title III, Tier Two reports, which list the type and quantity of hazardous substances on SPR facilities were submitted on time and provided to the appropriate agencies.

Environmental compliance and management audits were conducted in-house, by the DOE Strategic Petroleum Reserve Project Management Office (SPRPMO) appraisal teams and by outside entities during 2012. Ten low risk hazards and/or minor deviations from internal requirements and regulations were identified during internal audits in FY2012.

The SPR Environmental Management System (EMS) is certified by a third party registrar against the International Organization for Standardization (ISO) 14001:2004 standard. The third party surveillance audit conducted in 2012 resulted in the recommendation for continued certification and verified that the EMS remains suitable, adequate, and effective.

The Questionnaire/Reader Comment Form located in the front of this document may be utilized to submit questions or comments to the originator.

1 Introduction

This Strategic Petroleum Reserve (SPR) annual Site Environmental Report for calendar year 2012 was prepared to inform the U.S. Department of Energy (DOE), environmental agencies, and the public about environmental management performance and data gathered at or near SPR sites. It also summarizes compliance with environmental standards and requirements and highlights significant programs and efforts. The SPR is managed by DM Petroleum Operations for the U. S. Department of Energy.

1.1 Background Information

The SPR was established by the Energy Policy and Conservation Act in 1975. It provides the United States with sufficient petroleum reserves to mitigate the effects of a significant oil supply interruption. The mission of the SPR is to maintain a constant state of operational readiness to drawdown the reserve and supply oil to the country in an emergency as directed by the President of the United States. The Secretary of Energy also has the authority to acquire oil to fill the reserve or exchange current holdings to alter the mix of oil, to test the SPR's capabilities through test sales or to "loan" oil to refineries when their supplies have been temporarily disrupted.

The DOE Office of Deputy Assistant Secretary for the Petroleum Reserves has overall programmatic responsibility for establishing the objectives of the SPR. The SPR Project Management Office (SPRPMO) Project Manager is responsible for implementing these goals and objectives, including articulating an environmental policy statement that is responsive to Departmental requirements. The DOE SPR Environmental Policy (SPRPMO P 451.1C) is applied to SPR operations through the current M&O contractor's Environmental Policy (both in Appendix B).

Emergency crude oil supplies are stored by the SPR in salt caverns. The caverns were created deep within the massive Louann salt deposits that underlie most of the Texas and Louisiana coastline. The caverns currently in use were created through the process of solution mining. The utilization of the caverns to store crude oil provides assurance against normal hazards associated with the aboveground storage, offers the best security, and is the most affordable means of storage.

The Gulf Coast was chosen as the site of the SPR due to its large concentration of underground salt domes, and its large number of refineries and crude oil distribution capabilities. These attributes provide the flexibility needed to respond to a wide range of supply disruptions. As of December 2012 the SPR had approximately 696 million barrels of oil.

1.2 Locations, Facilities and Operations

The SPR presently consists of four Gulf Coast underground salt dome oil storage facilities, warehouse facilities, and a project management facility. The DOE St. James Terminal was leased to Shell Pipeline in January 1997 and is no longer an active SPR storage facility; it continues as SPR property and therefore, is addressed in applicable sections of this report.

1.2.1 Bayou Choctaw

The Bayou Choctaw storage facility is located in Iberville Parish, Louisiana. The storage facility occupies 356 acres of the Bayou Choctaw salt dome, including off-site satellite brine disposal wells and associated brine piping.

The Bayou Choctaw salt dome was selected as a storage site early in the SPR program due to its existing brine caverns, which were readily converted to oil storage, and its proximity to commercial marine and pipeline crude oil distribution facilities. Development of the site was initiated in 1977 and completed in 1991. One additional cavern was acquired, modified and completed in 2012.

The area surrounding the site is a freshwater swamp, which includes substantial stands of bottomland hardwoods with interconnecting waterways. Small canals and bayous flow through the site area and join larger bodies of water off-site. The site proper is normally dry and protected from spring flooding by the site's flood control levees and pumps. The forest and swamp provides habitat for a diverse wildlife population, including many kinds of birds, mammals and reptiles including the American alligator.

Table 1-1Bayou Choctaw

SPR Bayou Choctaw Storage Facility	
Location	**Plaquemine, LA**
Caverns	**7**
Storage Capacity	**74,000,000 Barrels**
Drawdown Rate	**515,000 Barrels/Day**

1.2.2 Big Hill

The Big Hill storage facility is located in Jefferson County, Texas. The site covers approximately 270 acres of the Big Hill salt dome. Off-site facilities include an intake structure that provides raw (brackish) water for cavern development and fluid movements, a brine line for brine disposal and a crude oil pipeline for receiving and distributing oil in commence.

Big Hill is the SPR's most recently constructed storage facility and is located close to commercial marine and pipeline crude oil distribution facilities. Development of the site was initiated in 1982 and completed in 1991.

Most of the site is upland habitat, consisting of tall grass with a few 150-year-old live oak trees. The nearby ponds and marsh provide excellent habitat for a diverse population of wildlife including the American alligator, over-wintering waterfowl, and several species of birds and mammals.

Table 1-2 Big Hill

SPR Big Hill Storage Facility	
Location	**Winnie, TX**
Caverns	**14**
Storage Capacity	**171,000,000 Barrels**
Drawdown Rate	**1,100,000 Barrels/Day**

1.2.3 Bryan Mound

The Bryan Mound storage facility located in Brazoria County, Texas. The facility occupies 500 acres and encompasses almost the entire Bryan Mound salt dome. Off-site facilities include a brine pipeline for brine disposal and crude oil pipelines for receiving and distributing oil in commerce.

The Bryan Mound salt dome was selected as a storage site early in the SPR program due to its existing brine caverns, which were readily converted to oil storage. Development of the site was initiated in 1977 and completed in 1987.

The marsh and prairie areas surrounding Bryan Mound are typical of those found throughout this region of the Texas Gulf Coast. Brackish marshland dominates the low-lying portions of the site. The coastal prairie is covered with tall grass forming cover and feeding grounds for wildlife. Marshes and tidal pools provide diverse habitats for a variety of birds, aquatic life and mammals.

Table 1-3 Bryan Mound

SPR Bryan Mound Storage Facility	
Location	**Freeport, TX**
Caverns	**20**
Storage Capacity	**254,000,000 Barrels**
Drawdown Rate	**1,500,000 Barrels/Day**

1.2.4 West Hackberry

The West Hackberry storage facility is located in Cameron Parish, Louisiana. The facility occupies 565 acres over the West Hackberry salt dome. Off-site facilities include an intake structure that provides raw (brackish) water for cavern development and fluid movements, brine disposal wells with associated brine piping and crude oil pipelines for receiving and distributing oil in commerce.

The West Hackberry salt dome was selected as a storage site early in the SPR program due to its existing brine caverns, which were readily converted to oil storage. Development of the site was initiated in 1977 and completed in 1988.

Numerous canals and natural waterways bisect the area. The surrounding area consists of marshland with natural ridges that support grass, trees and affect water flow through the marshes. These marshlands provide habitat for a variety of wetland and wildlife species.

Table 1-4 West Hackberry

SPR West Hackberry Storage Facility	
Location	**Hackberry, LA**
Caverns	**22**
Storage Capacity	**228,000,000 Barrels**
Drawdown Rate	**1,300,000 Barrels/Day**

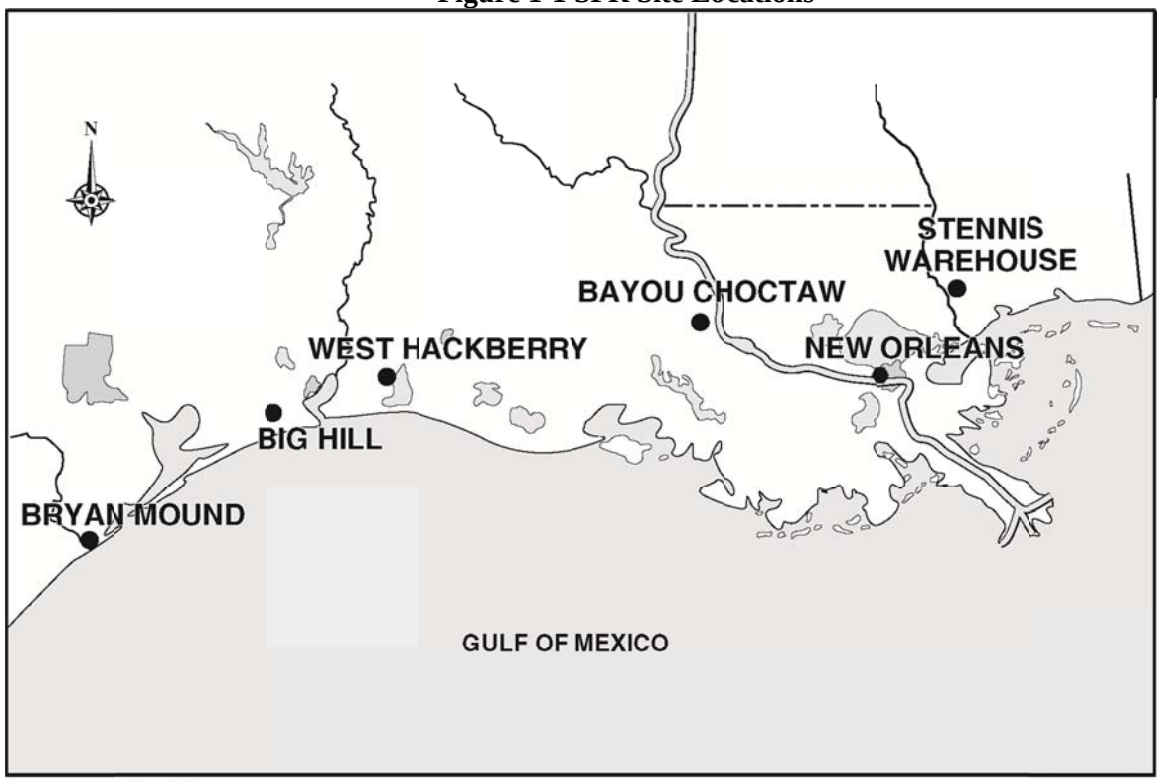
1.2.5 New Orleans

The project management office for SPR operations is housed in two adjacent office buildings with a nearby warehouse in Harahan, Louisiana, part of the New Orleans metropolitan area. This facility is the main office through which DM manages, operates, maintains and supports the crude oil reserve sites. Activities conducted at the New Orleans office complex are predominantly administrative. Office and warehouse space is leased, not owned, by the Department of Energy.

1.2.6 Stennis

The Stennis Warehouse facility is located in Hancock County, Mississippi. The warehouse and adjacent concrete aprons and parking lot occupy approximately 3.4 acres within the John C. Stennis Space Center. The warehouse has been leased from the U.S. Army since 2004. It is used to maintain and store heavy equipment and piping in support of the four storage sites. It also has office space permanently used by its tenants and, if needed, temporarily used by headquarters personnel.

Figure 1-1 SPR Site Locations



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End of Section

2 Compliance Summary

The federal, state and local regulations, Executive Orders (EOs) and DOE orders and directives that the SPR operates under are summarized in Table 2-1. A list of all applicable environmental regulations is provided in Appendix A1 and A2.

2.1 Regulatory Compliance Summary

The principal agencies responsible for enforcing environmental regulations at SPR facilities are:

- Environmental Protection Agency (EPA) Region VI,
- New Orleans and Galveston Districts of the U.S. Army Corps of Engineers (COE) NODCOE & GALCOE,
- U.S. Fish and Wildlife Service (F&WS),
- Louisiana Department of Environmental Quality (LDEQ),
- Louisiana Department of Natural Resources (LDNR),
- Louisiana Department of Wildlife and Fisheries (LDWF),
- Railroad Commission of Texas (RCT),
- Texas Commission on Environmental Quality (TCEQ),
- Texas General Land Office (TGLO),
- Texas Parks and Wildlife Department (TPWD) and
- Mississippi Department of Environmental Quality (MDEQ).

These agencies issue permits, review compliance reports, inspect site operations, and oversee compliance with regulations.

Table 2-1 Federal & State Environmental Regulations Applicable to the SPR

Regulatory Program Description	Compliance Status	Report Section
Clean Water Act (CWA), EPA Region VI, RCT, LDEQ and MDEQ establishes standards and issuing permits to improve water quality. LDEQ has primary enforcement responsibility for the NPDES in Louisiana. In Texas EPA and RCT issue NPDES permits.	SPR sites comply with the CWA through permitting under the NPDES program, following the Spill Prevention, Control and Countermeasures regulations and complying with the wetlands usage program.	2.3.1, 5.3, 5.4 & 5.5
Oil Pollution Act (OPA) of 1990 and TGLO improved the nation's ability to prevent and respond to oil spills and provides requirements for contingency planning both by government and industry	To meet OPA requirements the SPR conducts emergency drills at its sites each quarter in accordance with the National Preparedness for Response Program (PREP), along with full equipment deployment announced and unannounced exercises at each site annually.	2.3.2
Safe Drinking Water Act (SDWA) LDNR and RCT - Louisiana and Texas Underground Injection Control (UIC) programs regulate underground hydrocarbon storage, related brine disposal, and oil field wastes	SPR sites comply with the SDWA through permitting under the Louisiana and Texas UIC programs. The SPR operates 63 oil storage caverns, 21 saltwater disposal wells and 2 brine pipelines that extend into the Gulf of Mexico per the requirements in the permits.	2.3.3 & 5.3

Regulatory Program Description	Compliance Status	Report Section
Clean Air Act (CAA), the LDEQ and TCEQ regulates the release of air pollutants through permits and air quality limits.	SPR sites comply with provisions of the CAA and State Implementation Plans (SIP) through permitting and following applicable regulations. All of the SPR facilities operate in accordance with the provisions of the applicable state air permits.	2.3.4 & 5.2
Pollution Prevention Act of 1990, LDEQ, RCT and EPA Region VI focus on reducing the amount of pollution through cost-effective changes in production, operation, and raw materials use.	Each SPR site operates in accordance with a Stormwater Pollution Prevention Plan (SWPPP) prepared in accordance with EPA multi-sector general stormwater discharge authority for stormwater associated with industrial activity and similar Louisiana and Mississippi state requirements.	2.3.5 & 5.8
Resource Conservation and Recovery Act (RCRA), LDEQ, EPA and RCT govern the generation, storage, handling and disposal of hazardous wastes.	All SPR sites are classified as Conditionally Exempt Small Quantity Generators (CESQG). Hazardous wastes are not treated, stored, or disposed at any SPR sites therefore the sites are not RCRA-permitted.	2.3.6 & 5.6
Toxic Substances Control Act (TSCA) regulates the manufacture, use and distribution of all chemicals.	Procedures are in place to preclude or prohibit purchase of equipment containing either friable asbestos or PCBs.	2.3.7 & 5.7
National Environmental Policy Act (NEPA) requires federal agencies to follow a prescribed process to anticipate the impacts on the environment of proposed major federal actions and alternatives	SPR is in full compliance with NEPA requirements. Site-wide procedure and workflow have been established for implementing the NEPA requirements.	2.3.8
Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) LDEQ and TCEQ regulate the manufacture, use, storage and disposal of pesticides and herbicides.	The SPR hires state certified pesticide applicators to apply pesticides. In addition only chemical products on the SPR Qualified Products List (QPL) are allowed on site.	2.3.9
Endangered Species Act, LDWF and TPWD prohibit activities that would jeopardize the existence of an endangered or threatened species or cause adverse modification to critical habitat.	The Fish &Wildlife Service is consulted about the appropriate actions taken with regard to threatened and endangered species.	2.3.10 & 5.10
Executive Order 13186 "Responsibilities of Federal Agencies to Protect Migratory Birds Migratory Bird Act"	In a continuing effort to minimize disruption and provide suitable habitat to migratory birds at SPR sites, bird-nesting areas are closed or otherwise protected during critical periods to prevent disturbance as a result of site operations.	2.3.11
National Historic Preservation Act (NHPA) and State Historic Preservation Office (SHPO) identify, evaluate and protect historic properties eligible for listing in the National Register of Historic Places. NHPA is administered by state historic preservation offices.	No places on or eligible to the National Register of Historic Places are located on or adjacent to SPR sites. The BM site is located on a Texas State Historical Place for its significance to the sulfur mining industry and long-term development of the nearby town of Freeport.	2.3.12
Executive Order 11988 "Floodplain Management", **Executive Order 11990** "Protection of Wetlands", NODCOE, GALCOE, LDEQ and RCT	The SPR ensures compliance with EO 11988 & 11990 by maintaining compliance with NEPA requirements, identifying potential environmental impacts, and obtaining permits through the Corps Of Engineers and state coastal management agencies.	2.3.13

Regulatory Program Description	Compliance Status	Report Section
Executive Order 13423 "Strengthening Federal Environmental, Energy and Transportation Management" establishes new and updated goals, practices, and reporting requirements for environmental, energy, and transportation performance and accountability **Executive Order 13514 "** Federal Leadership in Environmental, Energy and Economic Performance" establishes an integrated strategy towards sustainability in the Federal Government	The SPR Sustainability Program develops goals and targets with regard to EO 13423 and 13514.	2.3.14 & 5.9
Superfund Amendments and Reauthorization Act (SARA), EPA, LDEQ, LDNR and TCEQ SARA Title III –specifies a number of responsibilities and reporting obligations for facilities with hazardous chemicals. **Emergency Planning and Community Right to Know Act** (EPCRA) establishes requirements for federal, state and local governments, Indian tribes, and industry regarding emergency planning and "Community Right-to-Know" reporting on hazardous and toxic chemicals	The SPR prepared and distributed SARA Title III Tier Two reports, also known as Emergency Planning and Community Right-to-Know Act (EPCRA) Section 312 reports by March 1, 2012 to state and local emergency planning committees and local fire departments. The SPR prepared and submitted Toxic Chemical Release Inventory (TRI) reports by July 1, 2012 to EPA.	2.3.15 & 5.7

2.2 Environmental Permit Compliance Summary

Permits in effect during 2012 include eight state and federal CWA wastewater discharge permits, five CAA permits, 35 active original structure COE wetlands (Section 404 of CWA) permits (not counting associated modifications and amendments), and more than 100 oil field pit, underground injection well, salt mining and hydrocarbon storage permits. In addition, a number of other minor permits were in effect during the year. Detailed site specific information about the major permits is presented in tabular form in Section 5.1.

During calendar year 2012, the LDEQ issued the modified WH air permit, effective February 20, 2012; which added emissions from maintenance leaching of the WH caverns. A temporary (six month) variance was also issued by LDEQ on March 7, 2012 to operate a temporary flare at BC to burn off any trapped ethane gases encountered during the drilling of the new wellhead at BC Cavern 102.

The BM air permit renewal application was submitted to TCEQ on November 28, 2011 and an amendment application for minor changes was submitted to TCEQ on August 8, 2012. The current BM air permit expires on June 11, 2012, but it is still applicable while TCEQ is processing the air permit renewal application. TCEQ granted two Permits By Rule on January 24, 2012 for emissions from maintenance leaching of the BM caverns and the BH caverns. TCEQ granted two Permit Alterations on April 19, 2012 to allow the BH and BM sites to continue to perform biennial inspections of fugitive components. No renewed discharge permits were issued in calendar year 2012.

2.2.1 Permit Compliance

Compliance with environmental permits is assured by meeting the conditions detailed within the permit. These conditions can be monitoring of components or processes, monitoring of pollutant effluents to ensure they meet permit limits, maintaining structures in their original condition, and inspecting facilities.

Air quality operating permits require piping components such as valves, flanges, pressure relief valves, and pump seals be inspected for leaks of VOCs on a regular basis (biennially in Texas and annually in Louisiana) using organic vapor analyzers (OVA). In addition, the Texas permits require that the flanges be inspected visually, audibly, and or by olfactory methods to identify any possible leaks on a weekly basis. All SPR air permits contain permit limitations based on pollutant emission rates in pounds per hour and tons per year.

The SPR ensures compliance with these permit limits by monitoring the processes that emit the pollutants. This includes monitoring use of generators, volumes of crude oil, diesel, and gasoline moved through tanks, volume of paint, and others. The results of this monitoring are reported to the agencies annually by BM and BH (if applicable) through an Emissions Inventory Questionnaire (EIQ). The BC and WH sites do not require reporting because they are below the required emission limit to report in Louisiana. All 2012 air reports were submitted to the appropriate agencies on time.

Water discharge permits require that analytical permit limits are met and reported. Other permit conditions require visual monitoring of the effluents to ensure that they have no visible sheen or foaming. All SPR sites periodically (daily, monthly and/or quarterly) monitor permit limit compliance with quarterly reporting through the NPDES, LPDES, and RCT Statewide Rule 8 Discharge Monitoring Reports (DMRs). All such reports were submitted to the appropriate agencies on time in 2012. Detailed site specific information about the major permits is presented in tabular form in Section 5.1.

2.2.2 Non-Compliances

There were nine permit non-compliances on the SPR out of a total of 1278 permit-related analyses reported in 2012. With nine total permit non-compliances an overall project-wide compliance rate of 99.3 percent for 2012 was achieved. Four of the nine non-compliances resulted from a single missed sampling event. Detailed information is provided in Table 2-2.

Table 2-2 SPR Discharge Permit Non-Compliances 2012

Site	Outfall Location	Permit Parameter	Value (Limit)	Cause
Bayou Choctaw	01B; treated sanitary sewage	Fecal Coliform	2000 col/100 ml; (400 col/100 ml)	Chlorine tablets lodged in chlorinator preventing adequate disinfection with the intermittent discharge. Semi-annual test sample taken on January 11, 2012; data received on January 16 and the chlorinator was repaired. January 17, retest sample indicates <10 col/100 ml, corrective action complete.
Bayou Choctaw	002; vehicle rinse station (no soaps)	COD TSS	1099 mg/l (300 mg/l) 181 mg/l; (45 mg/l)	Required quarterly samples taken June 7, 2012 indicated 2 exceedances: 1. Chemical oxygen demand (COD). Test results were not received in time (July 2) to accommodate retesting within the quarterly monitoring period. The elevated COD was not persistent as the next set of data taken on July 12, were acceptable. No direct cause for the excursion was able to be determined. 2. Total suspended solids value above the Daily Maximum effluent limit. The suspended solids may have been affected by windblown fines and smaller lightweight materials being removed from the paved washing pad during the sampling episode. Housekeeping actions were improved to address more complete removal of the dirt and debris falling from the rinsed vehicles.
Big Hill	001; brine discharge to the Gulf of Mexico	pH; O&G; TDS; TSS	missed monthly samples	Four non-compliances result from missing required samples for a single short duration brine discharge conducted during the month of November. The single discharge occurring on November 7 was not adequately communicated to sampling personnel. No other discharges were conducted during the month resulting in the technical noncompliance of not obtaining samples for monthly tests. Subsequent test data indicate no effluent limitation issues. Communications oversight is resolved.
Big Hill	002; treated sanitary sewer	pH	5.7 (6.0 to 9.0)	A low pH measurement was obtained on September 5th while the other effluent parameters for permit were found acceptable. The low pH was corrected and the plant was not found in an upset condition. Several influences on pH can occur with small package plan operations to include temperature and batching of the low flows.
Big Hill	002; treated sanitary sewer	pH	5.8 (6.0 to 9.0)	On August 27th samples taken for the monthly testing indicated a low pH for the discharge. The other permit parameters were found to be within acceptable range. The low flow conditions and high temperatures were suspected as causative factors. The condition was quickly corrected and the plant returned to normal operations.

2.2.3 Non-Routine Releases

State and federal agencies require notification if the amount of material spilled meets or exceeds the reportable criteria. This reportable criterion is established by each agency with jurisdictional responsibility. The majority of the non-routine releases of pollutants occur with the spills of crude oil and brine into the environment from SPR operations. In 2012 there were no reportable releases of crude oil or brine at any of the SPR sites.

During 2012 the SPR moved (received and transferred internally) 6.89 million m^3 (43.33 mmb) of oil and disposed of 12.95 million m^3 (81.44 mmb) of brine. The long-term trend for crude oil and brine spills and releases has declined substantially from 26 in 1990 to 0 reportable releases in 2012.

Table 2-3 Number of Reportable Oil & Brine Spills 1982-2012

Year	Type of Spill	Total Spills	Volume Spilled m^3 (barrels)	Percent Spilled of Total Throughput
1982	Brine	43	443.8 (2,792)	0.0005
	Oil	24	847.0 (5,328)	0.00704
1983	Brine	44	259.4 (1,632)	0.0002
	Oil	21	380.9 (2,396)	0.00281
1984	Brine	17	314.0 (1,975)	0.0003
	Oil	13	134.8 (848)	0.00119
1985	Brine	16	96,494.8 (607,000)	0.1308
	Oil	7	85.4 (537)	0.00122
1986	Brine	7	275.6 (1,734)	0.0017
	Oil	5	1232.5 (7,753)	0.01041
1987	Brine	22	96.5 (608)	0.0003
	Oil	5	2.5 (16)	0.00002
1988	Brine	12	93.8 (586)	0.0001
	Oil	6	8.8 (55)	0.00001
1989	Brine	17	131,231.6 (825,512)	0.1395
	Oil	11	136.4 (858)	0.00004
1990	Brine	12	11,944.3 (74,650)	0.0170
	Oil	14	74.8 (467)	0.00003
1991	Brine	7	1,156.8 (7,230)	0.004
	Oil	6	37.9 (237)	0.0004
1992	Brine	9	48.0 (302)	0.003
	Oil	5	1.9 (12)	0.00006
1993	Brine	6	59.2 (370)	0.001
	Oil	6	36.9 (232)	0.0007
1994	Brine	2	14.4 (90)	0.0006
	Oil	7	6.2 (39)	0.0003
1995	Brine	3	131.1 (825)	0.0028
	Oil	2	56.3 (354)	0.0006
1996	Brine	5	179.7 (1,130)	0.0014
	Oil	4	4.7 (30)	0.00002
1997	Brine	0	0	0.0
	Oil	1	0.32 (2)	4.0×10^{-9}
1998	Brine	3	6.2 (39)	0.00028
	Oil	1	Sheen	N/A
1999	Brine	0	0	0.0
	Oil	1	31.8 (200)	0.00056

Year	Type of Spill	Total Spills	Volume Spilled m^3 (barrels)	Percent Spilled of Total Throughput
2000	Brine	0	0	0.0
	Oil	1	11.1 (70)	0.00011
2001	Brine	1	0.019 (0.12)	5.60×10^{-7}
	Oil	2	1.6 (10)	0.0000163
2002	Brine	2	2.1 (13)	3.9×10^{-6}
	Oil	0	0	0.0
2003	Brine	0	0	0.0
	Oil	3	1.1 (7)	0.0000104
2004	Brine	1	1.6 (10)	2.2×10^{-7}
	Oil	0	0	0.0
2005	Brine	1	27 .0 (170)	5.5×10^{-6}
	Oil	0	0	0.0
2006	Brine	0	0	0.0
	Oil	2	0.5 (3)	3.3×10^{-6}
2007	Brine	0	0	0.0
	Oil	0	0	0.0
2008	Brine	0	0	0.0
	Oil	0	0	0.0
2009	Brine	1	0.8 (5)	0.000018
	Oil	0	0	0.0
2010	Brine	0	0	0.0
	Oil	0	0	0.0
2011	Brine	1	1.9 (12)	0.000045
	Oil	0	0	0.0
2012	Brine	0	0	0.0
	Oil	0	0	0.0

2.2.4 Environmental Reportable Project Events

Project events equal all reportable spills, and all discharge permit non-compliances. These events are used to provide a summary of SPR performance as illustrated in Figure 2-2. During 2012 there were nine total environmental reportable project events at the SPR.

Figure 2-1 Reportable Oil & Brine Spills 1990-2012

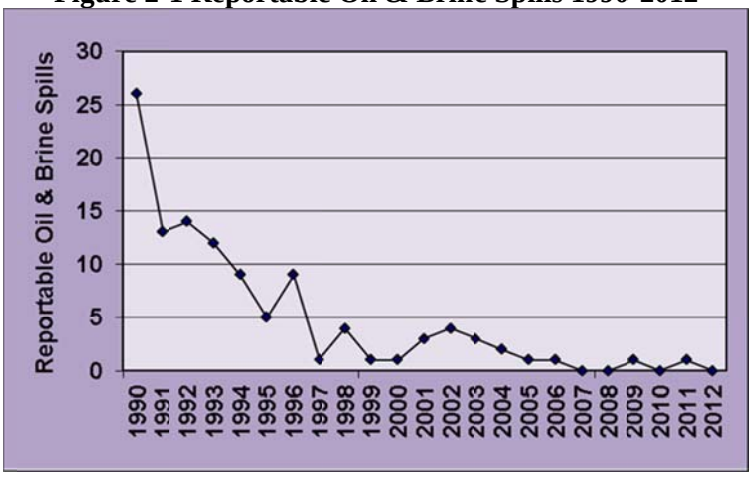
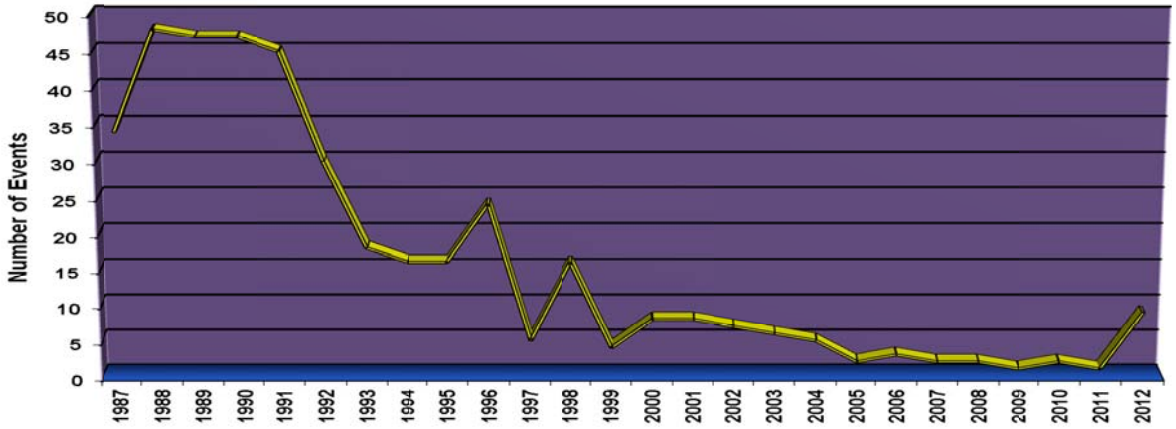


Figure 2-2 Environmental Reportable Project Events 1986-2012



2.3 Compliance Status

A major component of the SPR's compliance program is associated with meeting regulations under the CWA. At the beginning of the year, the SPR sites had a total of 95 wastewater and stormwater discharge monitoring stations that remained unchanged during this period, and 35 active (core-structure) individual wetland permits authorizing various structures at each of the sites. The SPR is also required to meet many requirements under the CAA and the SWDA and conduct waste management activities in accordance with RCRA and state guidelines. The following sections highlight primary compliance activities at the SPR sites by environmental statute.

2.3.1 Clean Water Act

SPR sites comply with the CWA through permitting under the National Pollutant Discharge Elimination System (NPDES) program. Additionally, the sites follow the Spill Prevention, Control and Countermeasures (SPCC) regulations, comply with the requirements of the Oil Pollution Act (OPA) of 1990 and comply with the wetlands usage program.

In 2012 modifications to the Texas sites federal discharge permits that set the minimum nozzle exit velocity at 30 feet per second (fps) remained in effect. These modifications increase dispersion of the offshore brine discharge further reducing potential impacts to organisms in receiving waters. Louisiana has primary enforcement responsibility for the NPDES discharge program, issuing permits under the CWA. The SPR maintains a Louisiana statewide permit from LDEQ for discharge of hydrostatic test water that minimizes permit-filing fees and increases flexibility in support of site construction and maintenance activities.

Each SPR storage site and the Stennis warehouse comply with the federal SPCC regulations and in Louisiana with the state SPCC regulations by following a plan that addresses prevention and containment of petroleum and hazardous substance spills. All of the SPR SPCC plans are

current in accordance with Title 40 CFR 112 and corresponding state regulations. The regulatory required five-year review of the BH SPCC Plan was completed mid-year 2012.

The SPR sites obtain permits from the COE and Coastal Zone Management representatives of the responsible state agencies whenever fill, discharge, or dredging occurs in a wetland. During 2012 there was one COE Programmatic General Permit (PGP) and one LDNR coastal zone consistency issued for the WH Valve Station 2 project. There were, however, several maintenance notifications made for dredging at the raw water intake structures (RWIS) for BM and WH, and traveling screen removals for repair and associated replacements at several of the sites.

2.3.2 Oil Pollution Act (OPA) of 1990

SPR emergency programs, planning, and management are guided by OPA 1990 regulatory standards for onshore storage facilities, pipelines, and marine terminal facilities. Facility Response Plans (FRP) on the SPR have been combined with the site emergency response procedures in accordance with the EPA "One Plan" scheme and meet or exceed the requirement of OPA 1990 and related state acts such as the Oil Spill Prevention and Response Act (OSPRA) in Texas. The plans are approved by the appropriate federal and state regulatory agencies. The Texas sites maintain their individual OSPRA certifications in accordance with state requirements.

The SPR conducts emergency drills or hands-on training of its sites each quarter in accordance with the National Preparedness for Response Program (PREP), along with full equipment deployment announced and unannounced exercises at each site annually. A professional staff of emergency management personnel from DM New Orleans (NO) coordinates these drills and exercises and includes the participation of public and regulatory/governmental agencies as available.

The SPR utilizes the National Incident Management System (NIMS), the response management system required by the National Oil and Hazardous Substances Pollution Contingency Plan. SPR site and New Orleans response management personnel have been trained in the unified Incident Command System, and a team of selected New Orleans personnel is available to support extended site emergency operations when needed.

2.3.3 Safe Drinking Water Act

The SPR oil storage caverns and brine disposal wells are regulated by the SDWA. The EPA granted primacy under the SDWA to both Louisiana and Texas Underground Injection Control (UIC) programs, which regulate underground hydrocarbon storage, related brine disposal, and oil field wastes. The SPR operates 21 saltwater disposal wells for the Louisiana sites. In Texas, brine is disposed via brine pipelines that extend into the Gulf of Mexico. Some ancillary commercial disposal wells are used occasionally. The 2012 Annual Report Form OR-1 for underground injection was completed and submitted on schedule to the LDNR.

Historic groundwater evaluations have indicated the presence of some shallow groundwater impacts from salt water at the BM and WH sites. At BM, data suggest that use of unlined brine storage pits by the previous industrial tenants may have been a major contributor to the salt

impacted groundwater located east of the site's closed large brine storage pond. As part of the site's overall groundwater surveillance, the post-closure monitoring near the BM brine storage pond is provided through this report to the RCT as requested.

The WH site completed closure of its brine ponds in 1999 under a Corrective Action Plan (CAP) negotiated with LDNR. All remedial recovery pumping was successfully completed in 2001. Post closure monitoring for three closed anhydrite ponds of certain wells for 30 years is currently met by monitoring quarterly and reporting annually in this SER, which is shared with LDNR. A 2002 proposal for resumption of a site-wide groundwater monitoring program addressing both the brine pond and anhydrite pond closures was approved by LDNR in 2004, and has been followed since.

Groundwater monitoring of the uppermost interconnected aquifer at all SPR sites is mandated through DOE orders for surveillance assessment and are coordinated on the SPR through the Environmental Monitoring Plan (EMP). Details of the groundwater monitoring of the site wide well nets are presented in Section 5. Of note, again this year, are the recognized saltwater impacts remaining from Hurricane Ike storm surge leaving two of five effected wells to continue with their freshening conditions.

Local public water systems supply drinking water to all storage sites, NO headquarters, and the NO and Stennis warehouses. Potable water systems at BM and BH are classified by state and federal regulations as "non-transient, non-community" public water systems, and these sites are required to have potable water monitoring programs. Unlike BH and BM, WH and BC facilities are not required to have potable water monitoring programs and are recognized as water purchasers only.

In 2012, drinking water samples were taken monthly at BH and BM and quarterly (though July) at BC for total coliform testing by state-approved outside laboratories. Residual chloramine was monitored weekly at BH and BM. Residual chlorine was monitored daily at BC until the site was connected to a municipal waste supply.

Potable water at BM, BH, and BC has been tested under state programs for lead and copper, most recently in 2008 at the BM and BC sites, and in 2009 at the BH site. Testing at BC was eliminated with the 2011 tie-in to the parish water supply. BM and BH remain in compliance. In 2012 testing for disinfection by-products was conducted through TCEQ at BM and BH. Test results for the two groups of disinfection by-products – trihalomethanes and haloacetic acids – show that concentrations continue to be below the maximum contaminant levels (MCL) at the two sites.

BH and BM calculate maximum residual disinfectant levels (chloramine) based on a running annual arithmetic average. Calculated results at both sites have not exceeded the regulatory MCL for disinfectants.

2.3.4 Clean Air Act

The SPR sites comply with the applicable provisions of the CAA and State Implementation Plans (SIP) through permitting and following applicable regulations. The state agencies have primacy

(LDEQ and TCEQ). All of the SPR sites are located in attainment areas for all National Ambient Air Quality Standards (NAAQS) pollutants with the exception of ozone. The BH and WH sites are located in attainment areas for ozone; therefore, it is regulated by the Prevention of Significant Deterioration (PSD) permitting program. The BC and BM sites are located in non-attainment areas for ozone; therefore, the New Source Review (NSR) permitting program applies. None of the SPR sites are considered to be major sources of air emissions during normal operations under PSD, NSR, Title III hazardous air pollutant (HAP), or Title V operating permit regulations. All of the facilities operate in accordance with the provisions of the applicable state air permits.

2.3.5 Pollution Prevention Act of 1990

Each SPR site operates in accordance with a Stormwater Pollution Prevention Plan (SWPPP) prepared in accordance with EPA multi-sector general stormwater discharge authority for stormwater associated with industrial activity and similar Louisiana and Mississippi state requirements. This multimedia document consolidates these regulatory agency requirements with EO 13423, which require a Pollution Prevention Program (PPP) and the related Waste Minimization and Solid Waste Management Plans.

2.3.6 Resource Conservation and Recovery Act

Hazardous wastes generated on the SPR are managed in strict compliance with state and EPA hazardous waste programs. The EPA has delegated the hazardous waste program to LDEQ in Louisiana and MDEQ in Mississippi. SPR Texas sites fall under the jurisdiction of the RCT, which has not yet received delegation; therefore, the SPR complies with both EPA and RCT regulations in Texas.

Large quantities of hazardous waste are not routinely generated at the SPR and the sites are classified as Conditionally Exempt Small Quantity Generators (CESQG). Hazardous wastes are not treated, stored, or disposed at SPR sites and therefore, the sites are not RCRA-permitted treatment, storage, and disposal (TSD) facilities. Each site has an EPA generator number that is used to track the manifesting of hazardous waste for off-site treatment or disposal. None of the SPR sites are identified on the National Priority Listing (NPL) under Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

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 related to the exploration, development, production or storage of crude oil or natural gas. These wastes are referred to as Exploration and Production (E&P) wastes. Hazardous E&P wastes are exempted from RCRA, but Congress did not include the underground storage of hydrocarbons in the scope of the E&P criteria. Under LA and TX regulations, underground storage of hydrocarbons is included in the E&P scope. In order to remain in compliance with federal law, the SPR does not dispose of hazardous waste under the "E&P" exemption rules. The SPR characterizes all E&P waste streams to determine if they exhibit hazardous characteristics, and any that do are managed and disposed as hazardous waste. The SPR disposes of non-hazardous wastes generated by the E&P process at state approved E&P disposal facilities. During CY 2012, 95 percent of non-hazardous E&P wastes (3502 tons) generated on the SPR was recycled. Other non-hazardous wastes, such as office wastes, are

managed in accordance with state solid waste programs. Hazardous waste that was generated during CY 2012 (199 lbs.) consisted primarily of laboratory wastes (generated at the SPR LA and TX on-site labs)

The SPR achieved the 100% Affirmative Procurement (AP) purchases target for fiscal year 2012. All purchases qualified as recycled products or justified virgin products. There were no purchases of virgin products in 2012. The DOE and M&O contractor's corporate environmental policies stress the SPR's commitment to waste management and environmental protection (Appendix B).

2.3.7 Toxic Substances Control Act

Friable asbestos is not present at SPR sites. Small amounts of non-friable asbestos usually in the form of seals or gaskets are disposed of locally as they are taken out of service, in accordance with applicable solid waste regulations. Non-asbestos replacement components are used. No liquid-filled electrical equipment or hydraulic equipment currently used on the SPR has been identified as polychlorinated biphenyl (PCB) equipment or PCB contaminated under TSCA. Procedures are in place to preclude or prohibit purchase of equipment containing either friable asbestos or PCBs.

2.3.8 National Environmental Policy Act

Approximately 682 documents that included design reviews, engineering change proposals, deviations, waivers and purchase requisitions were evaluated for NEPA review in 2012. Out of these documents, fifty-eight required NEPA categorical exclusion documentation. None of the projects associated with these documents had the potential to adversely affect any environmentally or culturally sensitive resources, such as structures of historic, archeological, or architectural significance or any threatened or endangered species or their habitat. Also, no wetlands were adversely impacted as a result of these actions. All of these NEPA reviews resulted in categorical exclusions that required no further action.

The purpose of the NEPA Program is to review all SPR projects in the early planning stages to ensure that environmental impacts and requirements are adequately evaluated. All activities on the SPR must have, or have had, a NEPA review. For most projects, the NEPA document is a "Record of NEPA Review" (RONR), which suggests that a project is a categorical exclusion (CX) or that the project is covered under an existing NEPA document. For those few projects not covered by a RONR, a higher level of NEPA review is required, and is part of the planning process. A RONR is required if the project's value is greater than $100,000 (for information systems, construction contracts, and service contracts) or for any project or task that might cause significant environmental impact. The following are reviewed for NEPA compliance:

- Conceptual Design Reports
- Definitive Engineering Scopes
- Statements of Work
- Work Orders or Service Orders
- Engineering Change Proposals
- Deviations and Waivers
- Design Reviews

- Purchase Requests
- Scopes of Work

A signed NEPA document is required 1) prior to detailed design beyond conceptual design, 2) before a scope of work is issued for construction or 3) before manpower commitment. The NEPA process is also a key method of identifying environmental aspects for incorporation into the EMS.

2.3.9 Federal Insecticide, Fungicide and Rodenticide Act

Much of the SPR property is developed with buildings, piping, cable trays, and other structures where the use of pesticide and herbicide products are necessary to control unwanted vegetation and other pests. During 2012 the SPR continued to use pesticide products to control pests in buildings and around work areas, control vegetation throughout site grounds and the security zone areas, and to mitigate the reduction of the number of personnel dedicated to mowing. Although the use of pesticides and herbicides is a necessary and integral part of property maintenance on the SPR, there is a concerted effort made, through screening of chemicals prior to purchase, to restrict the use of those products to the least harmful to the environment and the employees.

2.3.10 Endangered Species Act

In a continuing effort to minimize disruption and provide suitable habitat to migratory birds at SPR sites, bird-nesting areas are closed or otherwise protected during critical periods to prevent disturbance as a result of site operations. The F&WS is consulted in regard to appropriate actions taken that may affect migratory birds or threatened and endangered species. For example, the F&WS is consulted prior to the removal and/or relocation of threatened, endangered and nuisance wildlife.

As part of the original conditional coverage and as obtained through the re-issued Multi Sector General Permit (MSGP), a required signatory on each Notice of Intent (NOI) precipitated a formal review of site-specific potential endangered species impacts. This was accomplished prior to finalizing the NOIs and involved an update/comparison step with original Environmental Impact Statements (EISs), with the current ESA lists, and a generalized evaluation or assessment of any potential impacts relating to or resulting from SPR stormwater "sheet flow" run-off. No potential impacts were discerned at that time. The MSGP coverage has since been migrated to either the individual or general permits issued to each site.

2.3.11 Executive Order 13186 Responsibilities of Federal Agencies to Protect Migratory Birds & Migratory Bird Act

The active storage facilities comprising the SPR are located in a variety of environs and migratory pathways along the Gulf Coast of Texas and Louisiana. As such, a variety of waterfowl and other nesting birds frequent our sites during a typical year. Environmental awareness of migratory bird issues commences at the site level. Each site ES&H Manager implements site-wide surveillance in the conduct of normal operations. Selected fields are not mowed from early fall through early spring at BM, BH, and WH to provide food and shelter for migrating birds. At the BC site a feed plot is provided for wintering wildlife. When discovered,

nesting areas at all sites are flagged in the field for the duration of the nesting season (e.g. least terns); and equipment has been designated for limited/restricted use on occasion when they harbor bird nests (e.g. by mockingbird, mourning dove, and shrikes). At the WH site selected areas are not mowed and/or are posted to avoid from early spring through mid summer to allow bird nesting and brooding. These activities illustrate the coordination maintained with local Fish & Wildlife representatives at the SPR sites in fulfillment of environmental stewardship.

2.3.12 National Historic Preservation Act

No site projects required certified reviews by the Louisiana State Historical Preservation Office (SHPO) in 2012. No locations on or adjacent to SPR sites are on or eligible to the National Register of Historic Places. The BM SPR site is located on a Texas State Historical Place for its significance to the sulfur mining industry and long-term development of the nearby town of Freeport. A monument commemorates the historical significance of this location.

2.3.13 Executive Order 11988 Floodplain Management & Executive Order 11990 Protection of Wetlands

Since the inception of the SPR, compliance with EO 11988 has been maintained by complying with NEPA requirements, identifying potential environmental impacts, and obtaining permits through the COE and state coastal management agencies prior to any construction, maintenance, rehabilitation, or installation of structures and facilities. The measures that illustrate the SPR compliance with EO 11988 are also used to comply with EO 11990 and ensure that any practicable steps to minimize harm to wetlands are identified and taken.

2.3.14 Executive Order 13423 Strengthening Federal Environmental, Energy and Transportation Management & Executive Order 13514 Federal Leadership in Environmental, Energy and Economic Performance

In January 2007, President Bush signed EO 13423, “Strengthening Federal Environmental, Energy, and Transportation Management”. This EO consolidated and strengthened five previous executive orders and two memorandums of understanding, and established new and updated goals, practices, and reporting requirements for environmental, energy, and transportation performance and accountability. The EO requires federal agencies to lead by example in advancing the nation’s energy security and environmental performance. During 2012, the SPR made a concerted effort to successfully comply with the goals of the EO and associated requirements based on the implementation strategies developed in 2007.

EO 13514, “Federal Leadership in Environmental, Energy, and Economic Performance”, was signed on October 5, 2009 by President Obama to establish an integrated strategy towards sustainability in the Federal Government and to make reduction of green house gas emissions (GHG) a priority for federal agencies. The strategy to achieve this EO is similar to and integrates with that of previous EO 13423.

DOE Order DOE O 436.1 (Departmental Sustainability) and SPR PMO Order 436.1 (Site Sustainability) both delineate requirements and responsibilities to DOE and contractor personnel for implementing the goals of the two executive orders. These goals comprise the SPR Sustainability Program and are as follows:

- Increase energy efficiency and reduce Scope 1 and 2 green house gas (GHG) generation
- Reduce Scope 3 GHG generation
- Conduct an annual comprehensive GHG inventory
- Increase use of renewable energy and implement renewable energy generation projects on DOE property
- Install meters
- Reduce fleet consumption of petroleum products
- Promote high performance sustainable building design and construction
- Install cool roofs
- Promote regional and local planning
- Increase potable and industrial/landscape/agricultural (ILA) water use efficiency and management
- Achieve EPA's stormwater management objectives
- Promote pollution prevention and waste elimination
- Increase diversion of non-hazardous solid waste and construction/demolition materials and debris
- Increase diversion of compostable and organic material from waste streams
- Reduce paper use and acquisition
- Reduce and minimize the quantity of toxic and hazardous chemicals and materials acquired, used, and disposed
- Increase use of acceptable alternative chemicals and processes, including those that will reduce the use of chemicals that could threaten GHG reduction targets
- Implement pest management and other landscaping management practices
- Increase sustainable acquisition
- Meter data centers
- Promote electronic stewardship and energy efficient data centers
- Continue implementation and achieving these goals through an environmental management system

Each year the SPR Sustainability Planning and Implementation Committee oversee the identification, selection, scheduling, budgeting, and implementation of projects and activities that support the sustainability program. A brief synopsis of the goals, activities and projects that support the goals and FY 2012 performance are found in section 5.

2.3.15 Superfund Amendments and Reauthorization Act & Emergency Planning and Community Right-to-Know Act

SARA Title III Tier Two reports, also known as Emergency Planning and Community Right-to-Know Act (EPCRA) Section 312 reports, were prepared and distributed as required by March 1, 2012 to state and local emergency planning committees and local fire departments. Table 2-4 contains a summary of the inventory information that was submitted for 2012. The SPR continued to use an electronic format as required by the state implementing agencies for the preparation and submission of Tier Two Reports for the SPR facilities in Louisiana, Texas, and Mississippi.

SPR sites are required to report under EPCRA Section 313, by submitting Toxic Chemical Release Inventory (TRI) Form R when reporting thresholds, defined by emissions from crude oil placed in commerce, are exceeded. Specifically when crude oil is placed in commerce, it is considered to be repackaging of hazardous substances and must be reported. This form must be submitted by July 1 for the reporting thresholds exceeded during the preceding calendar year. The submittal of a TRI Form R was required for the BH, BM and WH sites in 2012 because the SPR introduced crude oil into commerce due to drawdown in 2011.

Table 2-4 2012 SARA Title III Tier Two Summary for the SPR

SPR Site	Chemical Name (Category)	*Max Daily Amt (lbs.)	Location on Site
BC	AFFF 3%	10,000 – 99,999	OPS., Foam Storage Building
	Crude Oil Petroleum	> 1 Billion	Flammable Storage Building, Site Tanks, Piping, Underground Caverns
	Diesel Fuel	10,000 – 99,999	Emergency Generator Fuel Tank, Property Tank 2
	Diesel Fuel #2	10,000 – 99,999	Contractor Laydown Area
	Gasoline, Including Casing Head	1,000 – 9,999	Property Tank 1
	Krylon Striping Paint	100 - 999	
	Nitrogen Balance Gas	10 – 99	Control Building
	Sulfur In Petroleum Crude Oil	0 – 99	Environmental Laboratory
BH	Crude Oil Petroleum	> 1 Billion	Flammable Storage Building, Site Tanks, Piping, Underground Caverns
	Chemguard 3%/6% AFFF	1,000 – 9,000	Operations 834
	Chemguard C301 MS AFFF	10,000 – 99,999	OPS BLDGS 805, AND 834. BHSE 834
	Diesel Fuel	10,000 – 99,999	Operations, BHT-4, BHT-50, BHT-51, and BHT 53
	FC 203CF Lightwater AFFF	10,000 – 99,000	Operations BLDG 805
	FC-600 Lightwater Brand AFFF	10,000 – 99,999	Operations Foam BLDG., BHT 16
	Hydrogen Sulfide	0 – 99	I & C OFFICE
	Sulfuric Acid	0 – 99	ENV. Lab, BLDG 803 CAB 5
	Xylene	0 – 99	ENV. Lab, Crude Oil Storage BLDG.
SW	Diesel Fuel	1,000 – 9,999	Outside Of Warehouse
BM	Crude Oil Petroleum	> 1 Billion	Flammable Storage Building, Site Tanks, Piping, Underground Caverns
	3% AFFF	100,000 – 999,999	Foam BLDG 207 AND 213, Tanks, Fire Truck
	Diesel	10,000 – 99,999	Fuel Tank, Piping, Workover
	Hydrogen Sulfide	0 – 99	Degas Plant
Offsite Pipelines	Crude Oil, Petroleum	50,000,000 – 99,999,999	Off-Site Pipelines In Calcasieu Parish, La (West Hackberry)
	Crude Oil, Petroleum	10,000,000 – 49,999,999	Off-Site Pipelines In Cameron Parish, La (West Hackberry)
WH	Amercoat Powder	1,000 – 9,000	Flammable Storage Bldg
	Bactron K-95	1,000 – 9,999	Above Ground Tank
	Crude Oil Petroleum	> 1 Billion	LCMS Piping, Site Tanks, Piping, Underground Caverns, Warehouse E
	Diesel Fuel	10,000 – 99,999	Fuel Pump Tank, Maintenance Laydown Yard
	Diesel Fuel #2	1,000 – 9,999	Workover Rig
	FC-203CF Lightwater Brand AFFF	10,000 – 99,999	Fire Truck WHFT3, BLDGs 303 and 304

SPR Site	Chemical Name (Category)	*Max Daily Amt (lbs.)	Location on Site
	FC-600 Lightwater Brand ATC/AFFF	1,000 – 9,999	BLDG 303, BLDG 305
	Gasoline, Including Casing Head	1,000 – 9,999	Fuel Pump Tank, Laydown Yard,
	Hydrogen Sulfide	0 – 99	Operations BLDG 301
	Purple K Dry Chemical	1,000 – 9,900	Operations BLDG
	Sweeping Compound Wax Base	1000 – 999	Warehouse

* Reporting range specified by LA, MS, or TX SARA Title III Tier Two Reporting Requirement based on location of site.

2.3.16 Federal Facilities Compliance Act

During 2012 none of the SPR sites generated any waste considered to be hazardous and radioactive (mixed waste). Therefore, this act did not apply to the SPR.

2.3.17 Atomic Energy Act of 1954

X-ray and other sealed radioactive sources are used at the SPR to perform analytical, monitoring and scanning activities. Conformance with this act is demonstrated by following state implementing agency radiation control regulations.

2.3.18 Preventing and Reporting Spills

The SPR crude oil storage sites are located near marsh or other wetland areas so protection of the environment through oil spill prevention and control is a primary commitment. Verbal notification and associated written reports to the appropriate regulatory agencies (e.g. National Response Center) occur as required, if the spill meets the reportable criteria. Each SPR site has structures in place to contain or divert any harmful release that could impact surrounding waterways or land areas. Onsite spill control equipment, detailed emergency plans, and extensive training are used to ensure that the environment is safeguarded.

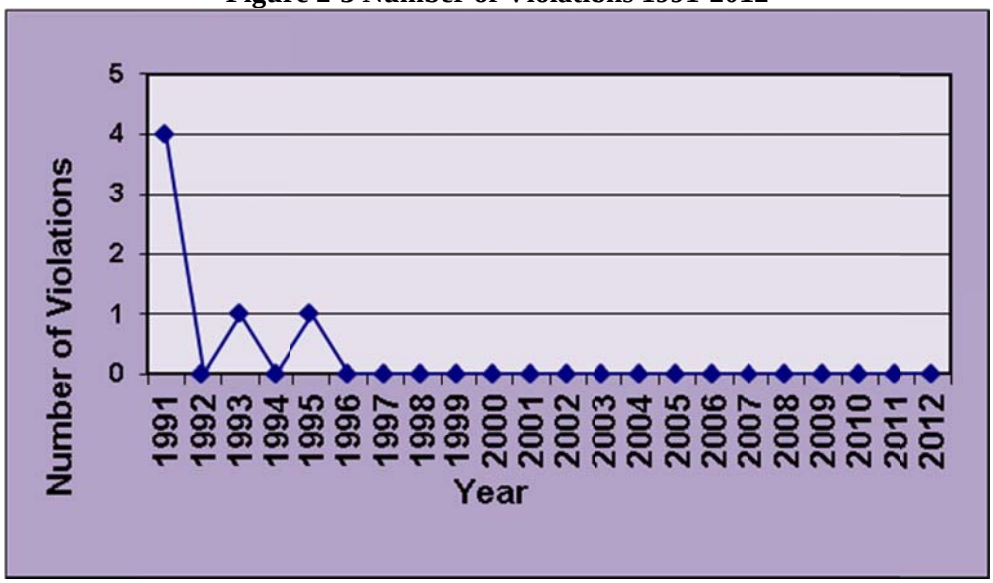
Site Emergency Response Procedures address spill reporting requirements of the SPR contractor, DOE, and appropriate regulatory agencies. Specific reporting procedures are dependent upon several key factors including the quantity and type of material spilled, immediate and potential impacts of the spill, and spill location (e.g., wetland or water body). All spills of hazardous substances are first verbally reported to site management and then through the SPR contractor management reporting system to New Orleans contractor and DOE management. The tool to document these spills is the Operations Control Center (OCC) Non-Routine and Occurrence Report form that is completed at the site level and then forwarded to the New Orleans OCC. Final written reports from the sites are submitted after cleanup, unless otherwise directed by the DOE or appropriate regulatory agency.

2.3.19 Notices of Violation, Notices of Deficiency, Notices of Intent to Sue, and other types of enforcement actions issued to the site

During 2012 the SPR did not have any compliance or cleanup agreements, environmental violations cited by regulators, notices of violation, notices of deficiency, notices of intent to sue or other types of enforcement actions issued at any of the sites. The SPR has continued to maintain a status of low risk to the environment. NOVs related to CAA, CWA and RCRA

activities have declined significantly from 4 in 1991 to zero since 1996 to date, as depicted in Figure 2-3.

Figure 2-3 Number of Violations 1991-2012



2.4 Major Environmental Issues and Actions

2.4.1 Gassy Oil

When SPR crude oil is brought to surface facilities, methane and ethane gas (non-regulated) that has migrated from the salt in the salt dome is released, stripping regulated pollutants (VOC) into the atmosphere. Also, geothermal processes raise the crude oil temperature, elevating the true vapor pressure (TVP) potentially above the atmospheric pressure of 14.7 pounds per square inch (PSI). This elevated vapor pressure may exceed regulatory limits for storage in floating roof tanks, potentially affecting some of the SPR sites and receiving commercial terminals (customers). Beginning in 1995 the SPR conducted operations to separate and remove gas from stored oil, in addition to heat exchangers used to cool oil prior to transport offsite. Recent operation of the degas plant at BH began in early 2004 and completed operations in October 2006. The degas plant was disassembled and moved to BM in 2007. Operations started in September 2007, and were completed in February 2011. The scope was developed for the degas project in 2012. The start of the proposed project to disassemble the unit at BM, transport, and reassemble over at the WH SPR site is set to begin in 2013.

2.4.2 Bayou Choctaw Cavern 102

In order to make certain that the SPR is able to successfully perform its mission of stockpiling crude oil in the event of a petroleum supply disruption; processes are monitored to ensure the integrity of the storage systems.

Sonar testing at the BC storage site identified Cavern 20 (BC-20) as being deficient. It was decided to empty BC-20 of crude and purchase BC Cavern 102 (BC-102), an existing cavern

owned by an adjacent private entity, as a replacement for BC-20. In 2010 DOE canceled the expansion at the Richton site and elected to pursue the purchase of BC-102 from Petrologistics, LLC. In November 2011, DOE acquired BC-102 through land condemnation.

In May 2010, DM commissioned services to conduct a Phase I Environmental Site Assessment of the BC-102 Cavern Site. The assessment was completed in June 2010 and indicated that there were no recognized environmental concerns (RECs) associated with the BC-102 cavern area. The wetland permit application was completed in March 2011 and the permit was received on October 4, 2011. Compensatory mitigation of 4.6 acres was procured from a mitigation bank.

During 2012 the SPR purchased the existing 102 cavern and well, drilled a new well into the existing cavern and connected BC-102 with the existing infrastructure at the BC site. Mechanical Integrity Test (MIT) of the cavern was successfully completed and approval to operate was granted by LDNR. The site completed a 100% construction Readiness Review Board checklist on 11/15/12. The next step in the process is to transfer oil to cavern BC-102, which is scheduled to begin in 2013.

2.4.3 Cavern Integrity

Texas Administrative Code (TAC), Title 16, Part 1, Chapter 3, Rule 3.95 (o) (3) requires storage wellhead components and casing to be inspected at least once every 10 years for corrosion, cracks, deformations or other conditions that may compromise integrity and that may not be detected by the five-year mechanical integrity test. In response, the SPR initiated a multi-sensor caliper program in 2008 to evaluate the condition of the last cemented casing string. In some cases where caliper results showed an irregularity, a downhole camera was run to better define the anomaly. If the anomaly is determined to be structural, plans are made to remediate the issue. The remediation varies depending on the type of anomaly involved. These remediations have been worked in conjunction with state regulatory agencies and in full compliance with the regulatory requirements. Once a cavern is depressured for workover, the wellhead components are taken off and inspected. This work continues in conjunction with the cavern workover and remediation programs. These programs were expanded to include the Louisiana SPR sites in addition to the required Texas sites. In FY 2012 mechanical integrity tests were completed on the following wells: BC 15, and 17; BH 102, and 112; BM 4, 102, 105, 106, 115 and 116; and WH 7, 102, 103, 105, 110 and 115. BH 114A did not pass pressure analysis and was remediated. A total of 23 multiple arm caliper were run at BC, BH, BM, and WH. A total of 6 remediations: BC 102A; BM 1, 102B, 102C, and 106B; and WH 6C were performed.

During CY 2012 at cavern BH 114A, it was concluded by Sandia National Laboratory subject matter experts that 2,480 barrels of crude oil leaked into the salt dome formation. Later in calendar year 2012 the reported loss was presented to the Big Hill Crude Oil Accountability Review Board and accepted.

2.5 DOE Onsite Appraisal

SPRPMO Management Appraisal teams conduct visits to all SPR sites annually to audit environmental compliance and EMS practices. Issues and programs reviewed in FY12 included chemical and waste management, air and water quality, and spill prevention control and

countermeasures. There were two minor environmental findings associated with these assessments.

2.6 Organizational Assessments

The New Orleans DM Environmental group conducts annual audits at all SPR sites covering compliance with all environmental programs and the EMS. Assessors were independent of the operating sites and were not accountable to those directly responsible for the issues audited. Specific topics are chosen based on current management concerns and the results of previous audits. DM identified 10 low risk hazards and/or minor deviations from internal requirements and regulations during FY12. Corrective action plans were developed and implemented for all. All audit findings are tracked to completion in the SPR's Assessment Tracking System (ATS).

2.7 Regulatory and ISO 14001 Registrar Inspections/Visits

There were eight inspections or visits by or on behalf of regulatory agencies and the ISO 14001 certification body (CB) to SPR facilities in 2012. These visits are summarized in Table 2-10. The regulatory visits are usually routine and are conducted by the regulatory agencies to ensure compliance or to address concerns regarding activities at the SPR facilities. The ISO 14001 registrar's visits were to conduct one semiannual surveillance audit and a recertification audit. There were no findings associated with the CB's recertification audit.

Table 2-5 Summary of Regulatory & Third-Party Inspections/Visits in 2012

Site	Organization	Remarks
BC	ISO 14001 CB	Recertification audit conducted. Granted certification.
BH	TGLO	Annual Oil Spill Prevention and Response audit conducted, and site passed.
	TGLO & US Coast Guard	Inspection in response to a spill at the raw water intake structure. It was determined that the spill did not originate from the SPR site.
	TCEQ	5 year inspection of the sewage treatment plant.
BM	TGLO	Annual Oil Spill Prevention and Response Audit
NO	ISO 14001 CB	Recertification audit conducted. Granted certification.
WH	ISO 14001 CB	Recertification audit conducted. Granted certification.
	LDEQ	Unannounced Routine Inspection

End of Section

3 Environmental Management System

To illustrate its commitment to excellence with regard to environmental management, DM operates within an Environmental Management System (EMS) that is third party certified against the International Organization for Standardization (ISO) 14001 standard. In 2009, the scope of the DM EMS was broadened to include the construction management system contractor.

All site personnel receive computer-based ISO 14001 EMS training annually. The training provides an overview of those elements of the ISO 14001 standard that involve all personnel. It also relates environmental aspects and impacts of SPR activities and environmental objectives to be achieved that year. Several environmental staff members have completed ISO 14001 Lead Auditor certification training. This training allows environmental staff members to better assist the SPR sites with regard to performing SPR site assessments, and due-diligence inspections of disposal and recycling facilities.

3.1 EMS Certification

On May 19, 2000, the EMS was first evaluated by an independent CB accredited by the American National Standards Institute/American Society for Quality (ANSI-ASQ) National Accreditation Board (ANAB) and certified in conformance with the ISO 14001 standard. The EMS was recertified in 2003, 2006, 2009 and 2012. Between certification and recertification activities surveillance audits are conducted by the CB every six months to evaluate the SPR EMS.

In 2012, one surveillance audit and one recertification audit were conducted by a third-party CB. Each crude oil storage site and the Stennis Warehouse were audited once and the New Orleans headquarters office was audited twice. At the conclusion of the surveillance audit, a recommendation was given for DM to maintain the ISO 14001 certification. All open nonconformities were closed and the SPR EMS was recertified by the CB during the recertification audit in 2012.

3.2 Integration of EMS with Integrated Safety Management System

DOE delegates responsibility and authority for the environmental component of the Integrated Safety Management System (ISM) to DM Petroleum Operations Company (DM). The purpose of ISM is to ensure that environmental, safety, and health requirements are an integrated but discernible part of the performance of all work, from the initial planning stage through to feedback and improvement. The SPR EMS Manual formalizes the environmental portion of ISM and defines the scope of the EMS in regard to the elements of the ISO 14001:2004(E) Standard and the requirements of EO 13423, EO 13514, and DOE Order 436.1. Although compliance with ISM does not ensure compliance with the ISO 14001:2004(E) Standard, DM has tailored the EMS to comply with both standards.

3.3 EMS Implementation

Conformance of the EMS to the ISO 14001 standard is illustrated through the DM SPR Environmental Management System Manual. The manual provides descriptions and references to SPR policies, plans, procedures, environmental aspects and impacts and objectives and targets that form the foundation of the EMS. Conformance with and implementation of each of the 17

ISO elements are discussed, as are the environmental management programs conducted in 2012 to achieve environmental objectives. This document is reviewed and revised at least annually. The EMS reinforces conformance with DOE Order 436.1 and the environmental management requirements of EO 13423 and 13514.

A brief synopsis of how the SPR EMS conforms to the ISO 14001 standard is provided in Table 3-1.

Table 3-1 Elements of the SPR EMS

Element	Implementation Summary
Environmental Policy	The SPR operates only in an environmentally responsible manner. Top management commits to and directs that all functional levels will: • comply with applicable legal and other requirements to which the SPR subscribes which relate to the environmental aspects of SPR activities, • prevent pollution through design, processes, practices, techniques, materials, products and services so that detrimental environmental impact is reduced or eliminated, and • continually improve environmental performance and sustainability through the EMS. The SPR Environmental Policy is signed and issued by the DOE Project Manager to communicate senior management's (DOE and DM) environmental and regulatory priorities and expectations. It is implemented by top management and is applicable to all SPR personnel and those who work on behalf of the SPR. Its scope includes the facilities and pipelines comprising the SPR. Protection of the environment, workers and the public are responsibilities of paramount importance. Environmental protection is integrated into all phases of activity.
Environmental Aspects	DM has a procedure to identify the environmental aspects (significant and otherwise) of its activities, products and services within the defined scope of the EMS. This includes the aspects that can be controlled and those that can be influenced taking into consideration planned or new developments, new or modified activities, products and services. Significant environmental aspects are taken into account in establishing, implementing and maintaining the EMS. The following environmental aspects are considered significant: Air emissions Environmental monitoring Fire Green procurement Project Design Waste Spills/Releases Natural resource preservation Cavern integrity Discharges Energy use Aspects of future activities are sought during the environmental review of purchase requests and designs. The design review process provides a mechanism by which new designs are reviewed by the appropriate personnel, including the environmental organization, for adverse environmental effects, compliance, and continuous improvement. The design review process fits together with the National Environmental Policy Act (NEPA) process at the conceptual stage, where new and previously recognized aspects are readily identified. The environmental review addresses compliance, pollution prevention opportunities, and general design or process improvements. Both of these processes provide the overall mechanism by which all projects and other issues are reviewed for their impact on the environment.

Element	Implementation Summary
Legal and Other Requirements	The applicable legal and other requirements that affect the SPR are described in permits issued by Federal and State agencies and the ES&H Standards List, which is provided in Appendix A1. The standards list is updated quarterly to reflect any necessary changes. Information on pertinent new or changed requirements is disseminated to DM subject matter experts (SMEs), affected departments, and appropriate management for review and feedback. If determined to be applicable, the SMEs provide guidance or information to affected departments and appropriate management for implementation.
Objectives, Targets, and Programs	Forty-six performance measures were tracked by the SPR EMS in FY 2012. A target is established for each objective. Some objectives have two targets, a "minimum" level that all DOE contractors should meet and a more challenging "stretch" level. EMS targets are either identified directly in contract Work Authorization Directives (WADs) as contract objectives or support the WADs, or indirectly through activities required by the DOE Strategic Sustainability Performance Plan (SSPP) to achieve Executive Orders 13423 and 13514. Refer to Tables 5-17 and 5-18 for all SPR institutional and sustainability objectives and targets and activities that support them.
Resources, Roles, Responsibility and Authority	The DM organizational infrastructure, roles, responsibilities, and authority are defined, documented, and communicated at all levels throughout the organization. DM's Human Capital department maintains job descriptions for all functions and maintains organizational charts with all DM positions. Ultimately, DM is held responsible by DOE for environmental stewardship at SPR facilities. Other DOE and DM subcontracted personnel who work at SPR facilities and those who work on their behalf also comply with DM's written environmental protection criteria. The DM EMS Management Representative is appointed by top management. Each SPR facility has a designated DM site EMS focal point responsible for communicating and working EMS issues at that facility. Other EMS focal points have been designated by the SPRPMO, and security and construction contractors.
Competence, Training and Awareness	DM determines training needs for each DM employee, offers training as appropriate to SPR contractors, and requires training for subcontractors as needed based on activity. DM uses several types of training modules and methodologies to educate workers, to achieve or improve worker competency and, subsequently, to improve their awareness and control of the environmental aspects and impacts of their activities and understanding of their roles and responsibilities to support the EMS. Training courses and personnel requirements are available from the Performance Improvement/Training Coordinator at each storage site. In DM contracts, environmental competency requirements for DM subcontractors are included in contract boilerplate, and the contract itself serves as the record of competency for subcontractors. DOE's construction contractor uses a similar boilerplate with competency requirements for its construction contracts.

Element	Implementation Summary
Communication	DM communicates issues internally throughout the organization and to DOE and other SPR contractors in numerous ways, such as through telephone, e-mail, letters, meetings, and tailgate discussions. Several procedures are used for communicating internally between organizations and various levels within DM, SPR contractors, and externally between external interested parties. Information regarding environmental aspects and the EMS is also communicated verbally in meetings at all levels of management., such as staff and scheduling meetings, readiness, technical, and project reviews, emergency response critiques, and EMS management reviews. Additionally, the DM CEO periodically discusses company issues in a brief video that is accessible to all SPR employees via the DM intranet. Response to external inquiries, including responses to inquiries related to significant environmental aspects, is provided to outside interested parties. DM maintains an Environmental Advisory Committee (EAC) as a communications conduit with the general public, environmental, cavern and pipeline engineering, and emergency management communities. Storage sites actively support and participate in emergency response and security activities with their communities such as through Community Awareness Emergency Response (CAER), local emergency planning committees (LEPC), and mutual aid programs. Annually, DM prepares this SPR Site Environmental Report that describes SPR environmental activities during the previous year. The report is distributed throughout the SPR as well as to the public (through libraries, media, elected officials, and interested parties).
Documentation	Environmental intentions are described at the highest level through DOE's SPR Environmental Policy and the DM Environmental Policy. The scope of the EMS, its elements, and supporting documents are described in detail in DM's SPR EMS Manual. Records required by the ISO 14001 standard are maintained in accordance with DM's record management system.
Control of Documents	Configuration management dictates that operating procedures and records be controlled. Publications are developed and managed in an electronic document management system. External documents such as various types of externally generated operations/maintenance logistics manuals are also controlled. Instructional and reference documents (both internal and external) that are part of the EMS are located or registered in an electronic web site. Some documents are purposely maintained in hard copy, such as "grab and go" documents that are used in emergencies. Hard copy locations and responsible holders are identified. All controlled documents are approved, revised as necessary, and maintained current.
Operational Control	DM has identified and continues to identify those operations and activities that are associated with significant aspects and impacts. Operational controls have been established for activities associated with significant aspects and impacts. These include broad as well as more aspect-specific documents (i.e. procedures and instructions) that address operational activities, planning, scheduling, maintenance, repair, and replacement of SPR equipment. Environmental boilerplate is attached as needed to vendor service and construction contracts to communicate specific requirements and procedures for controlling environmental aspects. Environmental permits provide specific environmental performance criteria that must be met to minimize adverse environmental impacts.
Emergency Preparedness and Response	DM is responsible for emergency response on the SPR. The emergency management program is defined by the Emergency Management Policy a comprehensive emergency management system program plan and site-specific emergency response procedures. The emergency management program provides the framework for development, coordination, control, and direction of all emergency planning, preparedness, readiness assurance, response, and recovery actions.

Element	Implementation Summary
Monitoring and Measurement	DOE requires all DOE contractors have comprehensive and integrated assurance systems for all aspects of operations essential to mission success. These assurance systems identify and address program and performance deficiencies, opportunities for improvement, and provide a means and requirements to report deficiencies to responsible managers and authorities, establish and effectively implement corrective and preventive actions, and share lessons learned across all aspects of operations. The monitoring and measurement requirements for regulatory compliance are described in this SPR Site Environmental Report that is generated annually. Internal procedures provide guidance in monitoring and measuring significant aspects and impacts and regulatory and programmatic monitoring of air, surface water, and groundwater at SPR sites. Objectives and targets based on the significant aspects and Executive Orders 13423 and 13514 are reviewed, tracked, and reported to upper management monthly. Process instruments and measurement and other testing equipment are calibrated to support operational control.
Evaluation of Compliance	Compliance with legal and other requirements is evaluated annually through a review of the environmental requirements in the ES&H Standards List and through organizational assessments at each site. Compliance criteria examined during organizational assessments are based on the environmental requirements identified on the ES&H Standards List. They pertain to water, air, waste, pollution prevention/waste minimization, and management oversight. Data taken to support permit requirements (i.e. water data that are reported on discharge monitoring reports) are evaluated to ascertain compliance with respective permits. Through the contractor assurance system (CAS) DOE requires DM to have established, auditable programs and systems. Contractor assurance systems address many types of assessments (i.e. from self-, third party, and independent assessments to management walk-throughs), event reporting, worker feedback mechanisms, and issues management (i.e. analysis of causes, identifying and tracking corrective actions, monitoring and closure, and verification of effectiveness). Contractors must annually submit to DOE for approval detailed CAS program descriptions for, among others, environmental, safety and health, safeguards and security, and emergency management – programs that are integrated into the EMS.
Non-conformity, Corrective Action and Preventive Action	DM subscribes to DOE's Occurrence Reporting and Processing System to identify, investigate, and correct non-conformances that occur during facility operations and activities. This includes spills and non-compliances with requirements. Operating experience of DOE and DOE contractor organizations is systematically reviewed for lessons learned, and the results are disseminated. This process reinforces the core functions and guiding principles of the DOE Integrated Safety Management System (ISMS) to enhance mission safety and reliability, and it provides mutual integration with the lessons learned requirements of other DOE directives. DM participates in the DOE-wide program for management of operating experience (OE) to prevent adverse operating incidents and to expand the sharing of good work practices among DOE sites. Assessment findings are managed and tracked in the Assessment Tracking System (ATS), a computer-based database. ATS is available to personnel throughout DM and DOE, and each finding/nonconformity entry in the database describes the issue and identifies responsibility for resolution. A corrective action plan is required for each SPR finding/nonconformity and includes, as applicable: 1) remedial action taken, 2) cause of the finding/nonconformity, 3) long-term corrective action planned, and 4) estimated date for completion of the plan. Results of corrected findings/nonconformities are examined during the subsequent assessments to determine the effectiveness of corrective action taken.

Element	Implementation Summary
Control of Records	The DM records management system is based on federal requirements established by the National Archives and Records Administration (NARA). NARA has developed a list of federal records and a general schedule for their disposition. DM further defines this schedule in DM's records and disposition schedule which provides guidance and instruction for DM's records management program, establishes policy and objectives for records management practices, assigns records management responsibilities at all levels of operations, and identifies and classifies records.
Internal Audit	The EMS is audited routinely by DM as part of the DM organizational assessments at each storage site and the main office. Both the compliance program and environmental management are reviewed extensively during these assessments. The entire scope of the EMS is audited at least annually. Audit plans that include criteria, scope, and audit methods are developed and approved prior to the assessments. Nonconformities are identified and tracked to completion in the Assessment Tracking System (ATS). DM auditors who audit EMS have received ISO internal auditor training prior to conducting such an audit.
Management Review	The Management Review Team is composed of the DM project manager and selected DM directors. The EMS Management Representative reports on the performance of the EMS to the team to evaluate improvement. DM facility (site) directors, site EMS focal points, the DM Environmental Manager, and representatives from DOE and the construction and security contractors support the Management Review Team and are invited to participate in management review meetings. Management reviews are twice during the year, and all elements of the standard are reviewed at least once annually. Suitability, adequacy, and effectiveness of the EMS are evaluated and voted on by team members at each meeting. Management review is also provided through weekly senior staff meetings, bimonthly project review meetings, quarterly energy efficiency/pollution prevention (E2P2) meetings, semiannual contract performance evaluations, and the DM occurrence reporting program.

End of Section

4 Environmental Radiological Program Information

Radioactive sources at the SPR consist of X-ray that is used in laboratory and scanning equipment or other sealed sources brought on site for the purpose of performing radiography and cavern wire-line type logging operations. Procedures are in place to protect personnel from exposure during these operations. In addition the SPR is subject to inspections by the state implementing agencies (LDEQ and Texas Department of Health) and required notices to employees are posted on each X-ray scanning device.

4.1 Sealed Sources

At the SPR sealed sources of radiation are used for monitoring activities related to the physical properties of crude oil, brine, and cavern dimensions. There were no issues involving sealed sources in 2012.

End of Section

5 Environmental Program Information

The SPRPMO Environmental, Safety, and Health Division (ESHD) is responsible for development and oversight of the ES&H programs and provides direction, technical guidance, and independent oversight to its prime contractors in the implementation of environmental programs and assessment of contractor performance. The SPR has had an Environmental Protection Program since its inception in 1978. The SPRPMO has assigned contractual responsibilities for implementation of the program to the current M&O contractor, DM. DM operates on behalf of DOE with regard to waste classification, representations, shipments, and disposal for all SPR activities. The SPR was the recipient of the DOE Silver GreenBuy Award for reaching the Leadership Goal for eight products in five different categories, achieving excellence in Sustainable Acquisition. A summary of the programs and procedures that presently make up the SPR environmental protection program is provided in Table 5-1.

Associated plans that support the SPR environmental program include the Emergency Management Plan and Implementing Procedures, the site specific Emergency Response Procedures with spill reporting procedures; the site-specific SPCC; the EMP which incorporates the Ground Water Protection Management Program (GWPMP) plan; and the Pollution Prevention (P2) Plan which includes the SWPPP for each site. The EMP, GWPMP, and the P2 Plan are reviewed and updated annually; the SPCC plans are reviewed and revised as needed or every five years per regulation.

Associated procedures that support the SPR environmental program are located in the DM Environmental Instructions Manual. These procedures identify requirements, responsible personnel, deadlines, and governing standards. Each site has developed instructions where needed that implement the environmental program specific to their facility

Table 5-1 SPR Environmental Protection Program Components

Programs & Procedures	Description
National Environmental Policy Act (NEPA) Program	Provides a comprehensive environmental review of all projects including purchase requisitions, engineering scopes of work, engineering change proposals, design reviews, and design changes for all SPR activities
Wetland & Floodplain Management Program	Addresses projects that have an impact on Section 404 of the CWA, Section 10 of the Rivers and Harbors Act, and state coastal zone management programs
Inspections, Appraisals, Assessments & Surveillance	Provides regular monitoring to ensure compliance with regulatory and policy requirements
Non-Routine Reporting System	Notification of oil, brine, or hazardous substance spills, and noncompliant effluent discharges, to identify the impact of such spills and discharges on property and the environment, and to comply with regulatory requirements
Routine Reporting Program	Fulfills self-reporting obligations under water, air and waste permits and regulations

Programs & Procedures	Description
Permit Monitoring Program	Ensures compliance with all permit requirements and limitations, onsite operations and maintenance activities
Environmental Monitoring & Surveillance Program	In place to detect any possible influence routine SPR operation may have on surface waters and groundwater on or near SPR sites and to provide baseline data in the event of an environmental upset
Discharge Procedures	Used by SPR sites when releasing liquid from any authorized containment or control system
Environmental Training Program	Ensures that applicable personnel are aware of the SPR EMS, environmental laws and regulations and are proficient in oil and hazardous material spill prevention and safe handling of hazardous waste
Pollution Prevention (P2) Program	Focuses on source reduction, recycling, reuse, affirmative and bio-based procurement and proper disposal of all wastes produced on SPR sites
Underground Injection Control Program (mandated by the Safe Drinking Water Act)	To ensure sound operation of Class II underground wells/caverns for brine disposal or hydrocarbon storage
Regulatory Review Program	Identifies new environmental requirements pertinent to the SPR
Employee Environmental Awards Program	Recognizes activities, initiatives and innovative approaches to environmental management and pollution prevention

Proper operation of the SPR with respect to the environment involves several types of reports and reporting procedures. DM provides several reports to, or on behalf of DOE. Table 5-2 contains a comprehensive list of environmental regulations and reporting requirements applicable to the SPR.

Table 5-2 Federal, State & Local Routine Regulatory Reporting Requirements

Regulation, Statute or Directive	Regulated Area	Enforcement Agency	Types of Required Permits, Applications, or Documentation	Routine Reporting Requirements
Clean Air Act	Control of hydrocarbon emissions from tanks, valves, and piping	TCEQ	Air Emissions Permit	Annual Emissions Inventory Questionnaires
			Air Emissions Permit Special Requirement	Monthly Tank Emissions
Clean Water Act	Wastewater discharges	U.S. EPA, Region VI	NPDES Permit	Quarterly monitoring reports
		LA Dept. of Env. Quality (LDEQ)	Water Discharge Permit	
		Railroad Commission of Texas (RCT)	Water Discharge Permit	

Regulation, Statute or Directive	Regulated Area	Enforcement Agency	Types of Required Permits, Applications, or Documentation	Routine Reporting Requirements
	Spill Prevention, Control and Countermeasures (SPCC)	U.S. EPA, LDEQ	SPCC Plan	Submit existing plan when spills on navigable waters exceed 1000 gals or occur ≥2x in 1 year
	Discharge notification	LDEQ, TCEQ, RCT, U.S. DOT, EPA	Verbal and written notification	Non-permitted discharges over Reportable Quantity
	Dredging maintenance, and any construction in wetlands for structures (Sections 404 & 10)	U.S. Army Corps of Engineers (COE)	Construct & Maintain Permit, Maintenance Notifications	Two-week advance of work start, notice suspension, and end.
SPR Environmental Management System (EMS) Manual (ASI5400.55). Section 1.5, Checking and Corrective Action, subsection 1.5.1 Monitoring and Measurement	Environmental Planning and Monitoring		Environmental Monitoring Plan	Annual revision
			Ground Water Protection Management Program Plan	Annual review (now contained in EMP)
			Site Environmental Report	Annual report
			Performance Indicators	Monthly electronic updates in Score Card data management system and quarterly report
	Waste Management / Pollution Prevention	DOE	Annual Report on Waste Generation and Pollution Prevention Progress	Annual summary of all wastes
SPRPMO Order 451.1D	NEPA Compliance	DOE	NEPA Planning Summary	Annual Report
			EIS Supplement Analysis	As needed
EO 13423 and EO 13514	Affirmative Procurement	DOE	Affirmative Procurement Report	Annual report (combined with EPEAT and Biobased reports)
	Electronic Product Environmental Assessment Tool (EPEAT)	DOE	EPEAT Report	Annual report (combined with Affirmative Procurement and Biobased reports)
	Compliance	DOE	Implementation Report	Quarterly status reports
	Environmental Management Systems (EMS)	DOE	EMS Progress Report	Annual Report
	Annual SPR Site Sustainability Plan (SSP)	DOE	Annual report on progress in meeting goals of EO 13423 and 13514	Annual report

Regulation, Statute or Directive	Regulated Area	Enforcement Agency	Types of Required Permits, Applications, or Documentation	Routine Reporting Requirements
Farm Security and Rural Investment Act of 2002	Procurement	USDA	Biobased Procurement Report	Annual report (combined with Affirmative Procurement and EPEAT reports)
Federal Migratory Bird Act	Disturbance of bird nests	US F&WS	Special Purpose Permit	As requested by USFWS
Miscellaneous State Environmental Regulations	Water withdrawal from coastal areas	TCEQ	Water Appropriation Permit	Annual Usage Report
	Pipeline usage	RCT	Pipeline and Gathering System Certification (T-4C)	Annual Certification
	Operation of relined brine ponds 7&37 BH	RCT	Operate and Maintain Permit, Weekly Leak Detection	Retain on site
	Surveillance of closed brine and anhydrite ponds	LDNR, RCT	Closure agreements, annual ground water monitoring results	Report in SER
National Environmental Policy Act	Review of proposed projects for environmental considerations	CEQ	Environmental Impact statements, Environmental Assessments	Only when not tiered under other EIS or EA.
			Categorical Exclusions	For projects that require consent.
	Inclusion of cooperating agencies in NEPA process	CEQ	Agency participation in NEPA activities to ensure adequate information in the decision-making process	Memorandum, as needed
Oil Spill Prevention & Response Act of 1991	Oil spill response in Texas coastal zone	TGLO	Discharge Prevention and Response Plan	Report spills of oil as required
			Discharge Prevention and Response Facility Cert.	Annual review by agency.
Pollution Prevention Act of 1990	Strategy to incorporate pollution prevention into ES&H goals	EPA, DOE	Pollution Prevention Plan, Waste Min Plan, Waste Mgmt Plan, Stormwater Pollution Prevention Plan	Annual update to Pollution Prevention Plan
Resource Conservation and Recovery Act	Hazardous waste generation and disposal	LDEQ	Annual Generators Report	Annual report to agency
			LA Notification of HW Activity	New waste stream, change in generator status
			LA Uniform HW Manifest	Complete and submit form with disposal
		RCT	TX Uniform HW Manifest	Complete and submit form with disposal
			Oil and Gas Waste Report	Annotate Report to Agency
			Texas Notification of hazardous waste activity	New waste stream or change in generator status

Regulation, Statute or Directive	Regulated Area	Enforcement Agency	Types of Required Permits, Applications, or Documentation	Routine Reporting Requirements
	Used oil burned for recovery	LDEQ, RCT	Uniform HW Manifest (Recycling)	Complete and submit form with disposal
	Non-hazardous oilfield waste disposal (exploration and production)	LDNR	Non-Hazardous Oilfield Waste Shipping Control Ticket (UIC-28)	Complete and submit form with disposal
	Non-hazardous special	LDEQ, TCEQ	Shipping Paper	Complete and submit form with disposal
	Waste Management	LDEQ, TCEQ	Monthly waste inventory form	Complete for documentation
			Weekly waste inspection form	Complete for documentation
	Affirmative Procurement	EPA	Affirmative Procurement Report	Annual Report (combined with EPEAT and Biobased reports)
Safe Drinking Water Act	Cavern formation, well workovers, and salt-water disposal wells	LDNR, Office of Conservation, Under-ground Injection and Mining Division	Well Work over Permit (WH-1)	Well Work over Report
			Cavern Inspection (29-M)	Semi-annual Cavern Inspection Report
			Saltwater Disposal (UIC-10)	Annual Saltwater Disposal Well Report
			Cavern Integrity Test Report	Annual Cavern Integrity
			Oil Wells Integrity (W-10)	Annual Oil Well Status Report
		RCT	Brine Injection Permit (H-10)	Annual Disposal/ Injection Wells Reports
		TCEQ	Weekly disinfectant residual concentration (BM and BH) Monthly total coliform test (BM and BH) Annual disinfectant and disinfectant by-products test (BM) Lead and copper test	Quarterly to agency Retain results on site Submit to TCEQ Frequency based on past test result

Regulation, Statute or Directive	Regulated Area	Enforcement Agency	Types of Required Permits, Applications, or Documentation	Routine Reporting Requirements
Superfund Amendment Reauthorization Act	Reporting of inventories of hazardous substances and materials stored on site	Louisiana Dept. of Public Safety and Corrections, Texas Dept. of Health Texas Department of State Health Services Tier II Chemical Reporting Program Mississippi Emergency Management Agency	Title III, Tier II	Annual Inventory Report Annual Inventory Report Title III, Tier II
	Reporting of discharges of all listed hazardous materials	EPA	Toxic Release Inventory, Form R	Complete and submit form when threshold exceeded

5.1 Environmental Program Permits

The active environmental permits required by regulatory agencies to construct, operate, and maintain the SPR are discussed by site. The SPRPMO negotiated a 20-year long-term leasing arrangement for use of the St. James site by the private corporation Shell Pipeline in 1997. Shell Pipeline retains all responsibility for maintaining necessary permits at St. James concurrent with their lease.

There are no permits for the Stennis Warehouse facility. A Certificate of No Exposure, declaring that all activities are conducted in a manner that will not expose potential pollutants to stormwater, was approved by the (MDEQ) in lieu of operating under a multi-sector general permit. The Certificate of No Exposure to stormwater was successfully renewed, as required, in 2009 remaining in full force for 2012. Air emissions from Stennis Warehouse operations are *de minimus*, requiring no permitting or reporting activity.

The SPR holds a general permit to discharge hydrostatic test water in the state of Louisiana that applies to all of the Louisiana SPR sites and their offsite pipelines. This permit requires quarterly discharge monitoring reporting.

LDEQ has primacy for the NPDES program in Louisiana that includes responsibility for all compliance and enforcement actions relating to the discharge of water in Louisiana. The LDEQ-issued general stormwater permit coverage remained in-force throughout 2012 for WH and for BC a combination of LCGP and MSGP coverage remains in force.

In Texas the RCT does not have primacy for the NPDES program; BH and BM operate under parallel EPA and RCT discharge permits. In addition to obtaining renewed federal coverage

(effective February 1, 2009), the two Texas SPR sites operate under authority granted with Statewide Rule 8 water discharge permits issued by the RCT

The Certification of No Exposure five-year renewal was processed to the MDEQ in 2009, for the Mississippi Stennis Warehousing operations in lieu of state issued MSGP stormwater coverage at that location. The renewed coverage continued in full force throughout 2012.

The air permits for the SPR facilities are administered by the LDEQ in Louisiana and the TCEQ in Texas. The WH air permit was modified in 2012 and issued by LDEQ on February 20, 2012. The BM air permit renewal application was submitted to TCEQ on November 28, 2011 and an amendment application was submitted to TCEQ on August 8, 2012. TCEQ is still processing the applications.

5.1.1 Bayou Choctaw Permits

Bayou Choctaw permits are listed in Table 5-3. Individual work permits are received from the Louisiana Underground Injection Control Division of LDNR for each well work over performed. State inspectors periodically visit the site to observe SPR operations. BC operates under the water and air programs delegated to Louisiana by EPA.

The site's security perimeter "clear sight zone" authorized and implemented by the NODCOE in the summer of 2006 was maintained by site personnel throughout 2012. This permit was modified to allow for the annexation of and construction work to the cavern 102 well pad. Additional appurtenances included a temporary personnel escape bridge and temporary ditch and ring levee during well construction.

Table 5-3 Bayou Choctaw Environmental Permits

PERMIT NUMBER	ISSUING AGENCY	PERMIT TYPE	EFFECTIVE DATE	EXPIRATION DATE	COMMENTS
LAG480540	LDEQ	LPDES	8/15/11	11/31/15	(1),(2)
1280-00015- 02	LDEQ	Air	12/2/99	Open	(3)
None	LDNR	Injection	01/11/83	Open	(4)
SDS-1	LDNR	Injection	09/09/77	Open	(5)
LMNOD-SP (Bull Bay) 3	COE	Constr. & Maintain	01/30/79	- *	(6)
LMNOD-SP (Iberville Parish Wetlands) 7	COE	Constr. & Maintain	09/26/77	-	(7)
LMNOD-SP (Iberville Parish Wetlands) 10	COE	Constr. &Maintain	06/12/78	-	(8)
LMNOD-SP (Iberville Parish Wetlands) 17	COE	Constr. & Maintain	11/06/78	-	(9)
LMNOD-SP (Iberville Parish Wetlands) 31	COE	Constr. & Maintain	05/27/80	-	(10)
LMNOD-SP (Iberville Parish Wetlands) 102	COE	Constr. & Maintain	09/26/77	-	(11)
WN-20-020-0168	COE	Constr. & Maintain	04/02/02	-	(12)
WT-20-020-2654	COE	Constr. & Maintain	08/20/02	-	(13)

PERMIT NUMBER	ISSUING AGENCY	PERMIT TYPE	EFFECTIVE DATE	EXPIRATION DATE	COMMENTS
WT-20-020-3621	COE	Constr. & Maintain	09/17/02	-	(14)
LMNOD-SP (Bayou Plaquemine)	COE	Constr. & Maintain	09/26/77	-	(15)
CT-20-030-1379-0	COE	Constr. & Maintain	03/12/03	-	(16)
CT-20-030-1501-0	COE	Constr. & Maintain	03/28/03	-	(17)
CT-20-030-3087-0	COE	Constr. & Maintain	07/25/03	-	(18)
MVN-2004-4453-CT	COE	Constr. & Maintain	10/14/04	-	(19)
MVN-2003-2234-CT	COE	Constr. & Maintain	02/2/06 Mod 10/4/11	-	(20)

* COE permits remain active for the life of the structure.

(1) LDEQ cancelled the LPDES converted permit LA0053040 and LA MSGP permit LAR05M577 replacing both with a single Light Commercial Facility (LCF) general permit LAG480540.
(2) The state's LPDES LCF general permit (LAG48000) was renewed 1DEC11 and discharge authority was given to BC on 15AUG11 after review of a full NOI from March. The former BC LCGP permit number remained intact.
(3) Site air operating permit modified 12/99
(4) Letter of financial responsibility to plug and abandon injection wells.
(5) Permit approved use of salt dome cavities for storage of liquid hydrocarbons.
(6) Maintain Bull Bay 24" brine disposal pipeline recorded with applicable Registrar of Deeds.
(7) Construct and maintain well pads (brine disposal wells).
(8) Enlarge existing well pads and construct access roads (brine disposal wells 1, 2, & 3.)
(9) Construct and maintain access road to brine disposal well area. NOTE: brine disposal pipeline was constructed under NWP authority and maintenance is allowed in conjunction with the access road permit. Major maintenance performed in 1996.
(10) Construct and maintain well pad, levees, access road & appurtenances to Cavern 102 and additional bank stabilization, warehouse pad and culvert per additions of 1983.
(11) Construct and maintain ring levee, drill site and appurtenances, Well 101.
(12) Install and maintain fill with culverts for parking. Permit authorized a construction period until 4/30/2007.
(13) Install and maintain culverts and fill to construct minor roadway crossings. Activity authorized under NWP-14 and provides a construction period until 8/20/2004.
(14) Replace, repair and maintain security fence with concrete footing and curbing. Activity authorized under NWP-3 and provides a construction period until 9/17/2004.
(15) Install and maintain 36" petroleum products pipeline under and across Bayou Plaquemine
(16) Install and maintain a replacement N-S bridge for an existing, permitted N-S bridge on the Main Site. Activity authorized under NWP-3; provides a construction period until 3/12/2005.
(17) Install and maintain a replacement brine disposal access road bridge for an existing permitted structure on the brine disposal access road. Activity authorized under NWP-3, provides a construction period until 3/28/2005.
(18) Install and maintain a bulkhead and fill for bank stabilization in the North-South Canal on the Main Site. Activity authorized under NWP-13 providing a construction period until 7/25/2005.
(19) Install and maintain refurbished Bailey Bridge crossing over Wilbert's Canal via NWP14, providing construction period for 2 years.
(20) Implement and maintain an expanded clear sight security perimeter zone. Requires compensatory mitigation and long-term oversight of the mitigation bank sites. Modified to include the acquisition of BC 102 and development of clear zone and cavern pad. Included compensatory mitigation via wetland mitigation bank credit purchases.

5.1.2 Big Hill Permits

Big Hill permits are listed in Table 5-4. In 2012, the site appropriated 9.92 million m^3 (8037.54 acre-feet) of water from the Intracoastal Waterway (ICW) exclusive of water for fire protection. This represents 26.79 percent of the current revised total allowable withdrawal for a year. The certified affidavit and annual report of water usage was forwarded to the TCEQ as required in 2012.

The M&O contractor is registered with TCEQ as a Public Water System Operations Company

(registration # WC0000073) since BH provides sanitary control of their purchased water distribution system on-site. This three-year registration was successfully renewed in May 2011. In addition, the M&O contractor is also registered as a Waste Water Operations Company (registration #OC0000067) which was successfully renewed in 2012 for a three-year period.

Required annual reporting for 2012 involved the successful brine line integrity test to Region 6 EPA, raw water usage to TCEQ; and crude oil pipeline system operations renewal (T4C) to the RCT.

TCEQ issued a Permit By-Rule in January, 2012 to authorize emissions from maintenance leaching of the BH caverns.

Table 5-4 Big Hill Environmental Permits

PERMIT NUMBER	ISSUING AGENCY	PERMIT TYPE	EFFECTIVE DATE	EXPIRATION DATE	COMMENTS
TX0092827	EPA	NPDES	02/01/09	01/31/14	(1)
NOT	EPA	NPDES	1/17/09	none	(2)
SWGCO-RP 16536 (01,02,03,04, 05)	COE	Constr. & Maintain	01/11/84	Dredging clause to 12/2008	(3) (4)
P-7	F&WS	Constr. & Operate	07/31/86	06/30/2036	(5)
9256	TCEQ	Air	01/11/08	01/10/2018	Site Air Permit
PBR 100485	TCEQ	Air	01/24/12	Open	Cavern Leaching
02939	RCT	Operate	11/28/83	Open	(6)
P000226A & P000226B	RCT	Operate/ Maintain	09/19/84	Open	(7)
0048295, 0048320, 004816, 004817	RCT	Operate	05/09/83 06/23/83	Open Open	(8)
UHS-006	RCT	Water Discharge.	01/01/11	12/31/2015 (extended)	(9)
4045A	TNRCC	Water Use	11/14/83	Open	(10)

(1) Renewal submitted 4/23/2008. Accepted as administratively complete 6/18/2008; comments to draft permit made Oct.2008; final permit issued Jan. 2009, effective 2/1/2009.
(2) NPDES coverage for Stormwater Associated with Industrial Activity was written into the individual permit TX0092827, as a result the former MultiSector General Permit (MSGP) coverage was terminated with a Notice of Termination instrument.
(3) Permits and modifications to construct and maintain RWIS, raw water 48" pipeline, brine disposal 48" pipeline, crude oil 36" pipeline. Maintenance dredging clause renewed until 12/31/08. Modified in 1996 for new integrity test method.
(4) Completion of raw water, brine disposal, and crude oil pipeline extended. Amended to install offshore pipeline by trenching. Dredging clause is allowed to lapse due to no RWIS dredging needed before expiration indicated above. Shall be renewed with next maintenance dredging activity/project.
(5) Completion of pipeline construction extended. (48" Brine Pipeline)
(6) Pipeline distribution system registration to operate crude oil lines. Renewed annually.
(7) Permits to operate and maintain anhydrite and brine/oil pits. Modifications are on file.
(8) Permits to create, operate, and maintain an underground hydrocarbon storage facility consisting of 14 caverns.
(9) Corresponds to TX0092827 (EPA-NPDES). Renewal sent October 2009; found administratively complete; permit renewed December 2010; effective 1/1/11.
(10) Permit amended in 1990 to allow for annual diversion of no more than 117,291 ac feet of water and to authorize diversion until termination of the project as a SPR operation. Modified in 1996 to reduce water set aside down to 30,000 acre/ft per year. Maximum Diversion Rate (MDR) 175 cubic feet per second (CFS).

5.1.3 Bryan Mound Permits

Bryan Mound permits are listed in Table 5-5. The BM air permit renewal application was submitted to TCEQ on November 28, 2011 and an amendment application was submitted to TCEQ on August 8, 2012. The current air permit expires on June 12, 2012; but is still applicable while TCEQ is processing the permit renewal/amendment applications. TCEQ issued a Permit-By-Rule in January, 2012 to authorize emissions from maintenance leaching of the BM caverns.

The BM site has a permit from TCEQ for the appropriation of state waters for the leaching program, site utility and fire protection systems. The permit requires a yearly report of the quantity of water used. In 2012, the site used a total of 1.892 million m^3 (1533.31 acre-feet) of water from the Brazos River Diversion Channel, representing 2.95 percent of the annual water usage authorized. The certified affidavit and annual report of water usage was forwarded as required in 2012.

Maintenance dredging in the approach channel to the RWIS was implemented in a single episode in 2012, using the Extension of Time replacement permit, SWG-2006-2658, effective July 10, 2007.

Required annual reporting for 2012 involved the successful brine line integrity test to Region 6 EPA, raw water usage to TCEQ; and crude oil pipeline system operations renewal (T4C) to the RCT.

The M&O contractor is registered with TCEQ as a Public Water System Operations Company (registration # WC0000073) since BM provides sanitary control of their purchased water distribution system on-site. In addition, the M&O contractor is also registered as a Waste Water Operations Company (registration #OC0000067) which was successfully renewed for a three-year period in 2012.

Table 5-5 Bryan Mound Environmental Permits

PERMIT NUMBER	ISSUING AGENCY	PERMIT TYPE	EFFECTIVE DATE	EXPIRATION DATE	COMMENTS
TX0074012	EPA	NPDES	02/01/09	01/31/14	(1)
NOT	EPA	NPDES	1/17/09	None	(2)
SWGCO-RP-12347 (03), repl. by SWG-2006-2568	COE	Constr & Maintain	02/22/78	Dredging clause open to 12/2017	(3)
3-67-782 (Docket#)	RCT	Injection	08/21/78	Open	(4)
3-70-377 (Docket#)	RCT	Injection	12/18/78	Open	(4)
P001447	RCT	Operate	01/12/95	None	(5)
3681A	TNRCC	Water Use	07/20/81	Open	(6)
UHS-004	RCT	Water Disch	04/01/09	03/31/14	(7)
82-8475	TDH&PT	Constr.	01/01/83	Open	(8)
SWGCO-RP-11666	COE	Constr. & Maintain	10/15/77	- *	(9)
SWGCO-RP-12112	COE	Constr. & Maintain	07/25/77	-	(10)
SWGCO-RP-12062 (03)	COE	Constr. & Maintain	10/10/78	-	(11)
SWGCO-RP-14114 (01)	COE	Constr. & Maintain	05/18/85	-	(12)
SWGCO-RP-16177	COE	Constr. & Maintain	09/07/82	-	(13)
SWGCO-RP-13435 (01)	COE	Constr. & Maintain	05/21/79	-	(14)

PERMIT NUMBER	ISSUING AGENCY	PERMIT TYPE	EFFECTIVE DATE	EXPIRATION DATE	COMMENTS
04994	RCT	Operate	08/01/00	Open	(15)
6176B	TCEQ	Air	06/12/02	06/12/12	Site Air Permit
52962	TCEQ	Air	11/07/02	11/07/12	Degas Permit
PBR 86655	TCEQ	Air	12/02/08	Open	BMT-3
PBR 100484	TCEQ	Air	01/24/12	Open	Cavern Leaching

* COE permits remain active for the life of the structure.

(1) Renewal submitted 4/23/2008. Accepted as administratively complete 6/18/2008; comments to draft permit made Oct.2008; final permit issued Jan. 2009, effective 2/1/2009.
(2) NPDES coverage for Stormwater Associated with Industrial Activity was written into the individual permit TX0074012, as a result the former MultiSector General Permit (MSGP) coverage was terminated with a Notice of Termination instrument.
(3) Maintenance dredging of raw water intake extended to 12/31/06. (SWGCO-RP 12347 authorized construction of RWIS). Extension/renewal authorizes spoil area addition. A renewed Extension of Time (EOT) re-authorized maintenance dredging for a ten year period effective July10, 2007.
(4) Approval of oil storage and salt disposal program.
(5) Authority to operate brine pond. Amended 1/12/95 to distinguish between primary and secondary liner. Authority to operate and maintain pit cancelled upon successful implementation of approved closure plan. Site-wide groundwater monitoring results to RT each year in SER.
(6) Permit expires at project end, covers 52,000 ac/ft/yr and MDR of 130 CFS per 2001 amendment.
(7) Corresponds with TX0074012 (EPA-NPDES). Renewal submitted 12/15/2008; RCT acted on permit in mid March2009, effective 4/1/09.
(8) Corresponds with SWGCO-RP-16177.
(9) For 30” crude oil pipeline to 3 miles SW from Freeport
(10) For 30” crude oil pipeline to 2 miles S from Freeport
(11) For 36” brine disposal pipeline & diffuser. Revision/amendment (01) deleted special condition (a) requiring maximized deep well injection; (02) approved construction of 24” replacement pipeline and diffuser in January 12, 1993. (03) Added the offshore additions the new integrity test method.
(12) General permit for pipeline crossings by directional drilling in navigable waters
(13) Place an 8” water line (PVC, potable)
(14) For construction of cavern pads 101, 102, 103, 111, and 113 in wetlands. Mod.01 added access road and fill placement for DCS-2.
(15) Pipeline distribution system registration to operate crude oil lines. Renewed annually with T-4C.

5.1.4 West Hackberry Permits

West Hackberry permits are listed in Table 5-6. The WH air permit was modified and issued by LDEQ on February 20, 2012. It includes the emissions from the degas plant when the unit is moved from the BM site to WH and emissions from maintenance leaching of the WH caverns.

WH authority to discharge wastewater from two named outfalls with an individual LPDES permit remained in full force during 2012, with the remainder of the retained stormwater held and released from secondary containments and the site’s stormwater associated with industrial activity covered under a state MSGP renewed in 2011, and as addressed in the site’s current SWPPP maintained throughout the year.

No construction activities, requiring permits review, authorization or permitting agency activity occurred in jurisdictional wetlands during 2012.

Table 5-6 West Hackberry Environmental Permits

PERMIT NUMBER	ISSUING AGENCY	PERMIT TYPE	EFFECTIVE DATE	EXPIRATION DATE	COMMENTS
LA0053031	LDEQ	LPDES	11/1/10	10/31/15	(1)
LAR05M559	LDEQ	LPDES	05/27/11	5/4/16	(2)

PERMIT NUMBER	ISSUING AGENCY	PERMIT TYPE	EFFECTIVE DATE	EXPIRATION DATE	COMMENTS
LMNOD-SP (LTCS) 26	COE	Constr.& Maintain	02/08/79	-	(3)
LMNOD-SP (Black Lk) 31	COE	Constr.& Maintain	10/26/82	-	(4)
LMNOD-SP (Black Lk) 43	COE	Constr.& Maintain	07/26/84	-	(5)
LMNOD-SP (Gulf of Mexico) 2574	COE	Constr.& Maintain	08/11/80	-	(6)
LMNOD-SE (LTCS) 40	COE	Constr.& Maintain	05/25/88	-	(7)
LMNOD-SP (Cameron Parish Wetlands) 162	COE	Constr. & Maintain	03/09/78	-	(8)
SDS-9	LDNR	Injection	08/07/79	Open	(9)
None (Letter)	LDNR	Injection	01/11/83	Open	(10)
971198-9	LDNR	Injection	09/27/83	Open	(11)
0560-00019-04	LDEQ	Air	2/20/12	Open	-
SWGCO-RP-12342	COE	Constr. & Maintain	03/28/78	-	(12)
LMNOD-SP (Cameron Parish Wetlands) 152	COE	Constr. & Maintain	03/16/78	-	(13)
LMNOD-SP (Cameron Parish Wetlands) 276	COE	Constr. & Maintain	02/11/80	-	(14)
WN20-000-3972-0	COE	Constr. & Maintain	8/31/00	-	(15)
WO-20-020-1136	COE	Constr. & Maintain	01/25/02 02/19/02	-	(16)
WO-20-020-3607	COE	Constr. & Maintain	10/23/02	-	(17)
WW-20-030-3748	COE	Constr. & Maintain	10/22/03	-	(18)
MVN-1997-00068 WW	COE	Constr. & Maintain	4/29/2009	4/29/2014	(19)

(1) LDEQ obtained primacy and issued an LPDES permit with former NPDES number, effective 11/1/2004. Renewal application processed in April 2009, found administratively complete, and finalized in 2010 for a five-year term.
(2) LPDES Multi-Sector General Permit (MSGP) coverage for Stormwater Associated with Industrial Activity obtained as a renewal with a NOI dated 1/22/01; coverage was automatic 48 hours after postmark State issued LPDES permit in May 2001. State renewed authority for the MSGP became effective 5/1/2006; a re-instatement letter effective 5/27/2006 replaced the expired coverage with the new MSGP authority (and conditions) maintaining existing permit number for a five-year state renewal cycle.
(3) Construct and maintain RWIS and 42" raw water pipeline. Modified in 1998 to add the recirculation system discharge point; and in 2006, programmatic general Category II permit MVN-2006-1387-WY was issued for RWIS maintenance modifications and for the 48" replacement pipeline; carries consistency determination C20060053 from LDNR.
(4) Maintenance dredging for firewater canal and extended boat slip access amendment of 1993.
(5) Construction of erosion control dike completed in 1986. Maintenance dredging open until 7/26/94; addition of riprap amendment of 1993 open until 1995.
(6) Amended to install parallel pipeline (05/29/86); offshore brine line and diffuser remains inactive.
(7) Permit to construct and maintain 36" crude oil pipeline from site to Texoma/Lake Charles Meter Station (LCMS).
(8) Permit to maintain 42" crude oil pipeline.
(9) Approval to create 16 additional salt dome cavities
(10) Letter of financial responsibility to close all injection wells on this site. Still active
(11) Approval to construct and operate wells 117A and B.
(12) For 42" crude oil pipeline crossings of waters & waterways in Texas
(13) For brine disposal wells, well pads, and brine disposal pipelines, (12", 20", & 24")
(14) For well pads, levees, and access roads (Wells 110, 111, 112, 113, 114, & 115)

(15) Category I programmatic general permit. Repair exposed 42" crude oil pipeline.
(16) Restore riprap along the north perimeter dike adjacent to Cavern 6 and Black Lake. Permit authorized a construction period until 1/25/2007.
(17) Deposit fill in the fire ditch. Permit authorized a construction period until 10/23/2007.
(18) Modifications to the existing Boat Ramp; and, re-establishment of the erosion control breakwater in Black Lake along the north side of the site. Authorizes construction period until October 31, 2008 and includes an associated Water Quality Certification and Federal Consistency Determination for the activity.
(19) Time extension granted for maintenance dredging at the RWIS for five-year period commencing with the date of the letter response; carries consistency determination C20090198 from LDNR.

5.2 Air Quality

Air pollutants of concern emitted by the SPR sites are either hazardous or have an impact on the ambient air quality. Benzene, toluene, ethyl benzene, and xylene are HAPs that are emitted in relatively small quantities and do not trigger HAP reporting. The non-hazardous pollutants that have an impact on air quality are non-methane/non-ethane VOCs, nitrogen oxides (NOx), sulfur dioxides (SO_2), carbon monoxide (CO), and particulate matter (PM_{10}). The quantity of these pollutants emitted is minor relative to other facilities in the respective air quality regions.

Monitoring for air pollutants consists of monitoring processes and calculating the volume through the use of acceptable industry practices. These results are compared to the permitted limits to ensure that they are in compliance. Monitoring at the SPR consists of measuring the following in order to quantify emissions:

- run-time of diesel powered emergency electrical generators;
- volume and type of crude oil flowed through frac tanks, floating roof tanks, diesel tanks, gasoline tanks, and oil-water separators;
- volume of paint and solvent used on-site;
- volume of brine which may release VOCs placed into the brine pond;
- number of piping components that emit over the acceptable regulatory limits by monitoring all components with an OVA.

Monitoring for air pollutants is conducted at both Texas and Louisiana sites. The results are reported to the Texas state agency through EIQs. The Louisiana sites are exempt from reporting because their emissions are below the regulatory threshold for reporting in their respective air quality regions. Even though the results of monitoring for BC and WH are not reported, they are used to determine ongoing compliance with the permit and assure adequate performance of emission control equipment.

In addition, air pollution control equipment monitoring is performed at SPR sites. Air regulations require that seals on internal and external floating roof tanks be inspected at frequent intervals for visible tears, holes, or cumulative gaps exceeding regulatory limits, and to ensure they are operating accordingly. The BH and BM sites each have an external floating roof tank that requires inspection of the primary (every five years) and secondary (semi-annual) seals. The two internal floating roof tanks at BM have a mechanical shoe seal that requires seal inspections every year.

5.2.1 Bayou Choctaw

Located in a marginal nonattainment area for ozone, BC is permitted to emit 7.4 metric tons per year (tpy) (8.14 tpy) of VOC. Since this site emits less than nine metric tpy (10 tpy), it is not required to submit an emissions inventory summary (EIS) to report its annual emissions. Although BC is exempt from reporting emissions, monitoring was conducted in 2012 on all permitted sources. These sources include the volume of crude oil in slop tanks and frac tanks, volume of brine flowing through the brine pond, fugitive emissions from monitoring piping components for acceptability, and monitoring the run-time of the emergency generators. BC operated in accordance with all air quality regulatory requirements in 2012. Table 5-7 provides a summary of the permitted limits and actual emissions for BC.

Table 5-7 Parameters for Bayou Choctaw Emission Points

Emission Point Description	Parameter	Permit Limits Metric tpy (tpy)	Actual Emissions Metric tpy (tpy)
Crude & Slop Oil Tanks	VOC	2.43 (2.67)	0.25 (0.27)
Gasoline Fuel Tank	VOC	0.52 (0.57)	0.15 (0.17)
Frac Tanks	VOC	1.42 (1.56)	0 (0)
Brine Pond	VOC	1.14 (1.26)	0.11 (0.12)
Fugitive Emissions	VOC	1.66 (1.83)	0.05 (0.06)
Air Eliminator	VOC	0.04 (0.04)	0 (0)
Emergency Generators/Pumps	VOC PM_{10} SO_2 NOx CO	0.19 (0.21) 0.18 (0.20) 0.72 (0.79) 5.54 (6.09) 1.26 (1.39)	0.02 (0.02) 0.18 (0.20) 0.72 (0.79) 0.49 (0.54) 0.11 (0.12)

5.2.2 Big Hill

Located in an ozone attainment area, BH is permitted to emit 16.56 metric tpy (18.20 tpy) of VOC. BH is required to use an EIQ to report its annual emissions if it emits 10 tpy of VOC. Monitoring was conducted in 2012 on all permitted sources, such as the volume of crude oil in slop tanks, frac tanks, and surge tanks; volume of brine into the brine pond; and monitoring the run-time of the emergency generators. BH operated in accordance with all air quality regulatory requirements in 2012. Table 5-8 provides a summary of the permitted limits and actual emissions for BH.

Table 5-8 Parameters for Big Hill Emission Points

Emission Point Description	Parameter	Permit Limits Metric tpy (tpy)	Actual Emissions Metric tpy (tpy)
Crude & Slop Oil Tanks	VOC	1.45 (1.60)	1.10(1.21)
Gasoline & Diesel Fuel Tanks	VOC	0.35 (0.39)	0.27(0.30)
Frac Tanks	VOC	10.04	5.51 (6.06)
Brine Pond	VOC	11.97 (13.15)	7.51 (8.25)

Emission Point Description	Parameter	Permit Limits Metric tpy (tpy)	Actual Emissions Metric tpy (tpy)
Fugitive Emissions	VOC	2.59 (2.86)	0.10 (0.11)
Air Eliminator	VOC	0.07 (0.08)	0 (0)
Solvent Recycler	VOC Acetone	0.01 (0.01) 0.01 (0.01)	0 (0) 0 (0)
Emergency Generators/Pumps	VOC PM_{10} SO_2 NOx CO	0.10 (0.11) 0.09 (0.10) 0.64 (0.70) 2.30 (2.54) 0.53 (0.58)	0.06 (0.07) 0.07 (0.08) 0.02 (0.02) 2.10 (2.31) 0.48 (0.53)

5.2.3 Bryan Mound

Located in a marginal non-attainment area for ozone, BM is permitted to emit 22.6 metric tpy (24.8 tpy) of VOC. Since the site emits more than nine metric tpy (10 tpy), it is required to use an EIQ to report its annual emissions. Monitoring was conducted in 2012 on all permitted sources. These sources include the volume of crude oil in slop tanks, frac tanks, one external floating roof tank and two internal floating roof tanks; volume of brine into the brine tank; and monitoring the run-time of the emergency generators. BM operated in accordance with all air quality regulatory requirements in 2012. Table 5-9 provides a summary of the permitted limits and actual emissions for BM.

Table 5-9 Parameters for Bryan Mound Emission Points

Emission Point Description	Parameter	Permit Limits Metric tpy (tpy)	Actual Emissions Metric tpy (tpy)
Crude & Slop Oil Tanks	VOC	8.52 (9.37)	3.77 (4.14)
Gasoline & Diesel Fuel Tanks	VOC	0.38 (0.42)	0.32 (0.35)
Frac Tanks	VOC	25.0	0 (0)
Brine Tank	VOC	4.92 (5.42)	6.54 (7.19)
Fugitive Emissions	VOC	0.89 (0.98)	0.08 (0.09)
Paints & Solvents	VOC	0.62 (0.68)	0.06 (0.07)
Emergency Generators/Pumps	VOC PM_{10} SO_2 NO_x CO	0.06 (0.07) 0.06 (0.07) 0.50 (0.55) 1.62 (1.79) 0.37 (0.41)	0.07 (0.08) 0.08 (0.09) 0 (0) 2.07 (2.28) 0.47 (0.52)
Degas Plant	VOC NO_x CO SO_2 PM_{10}	3.48 (3.84) 13.67 (15.07) 17.23 (18.99) 0.34 (0.37) 1.24 (1.37)	0 (0) 0 (0) 0 (0) 0.00 (0.00) 0 (0)

5.2.4 West Hackberry

Located in an ozone attainment area, WH is permitted to emit 49.1 metric tpy (53.9 tpy) of VOC. Since the site emits less than 90.8 metric tpy (100 tpy), it is not required to submit an EIQ to report its annual emissions. Although WH is exempt from reporting emissions, monitoring was conducted in 2012 on all permitted sources. These sources include the volume of crude oil in

slop tanks and frac tanks, volume of brine into the brine tank, monitoring piping components to determine fugitive emission acceptability, and monitoring the run-time of the emergency generators. WH operated in accordance with all air quality regulatory requirements in 2012. Table 5-10 provides a summary of the permitted limits and actual emissions for WH.

Table 5-10 Parameters for West Hackberry Emission Points

Emission Point Description	Parameter	Permit Limits Metric tpy (tpy)	Actual Emissions Metric tpy (tpy)
Slop Oil Tanks & Sump	VOC	1.74 (1.92)	0.48 (0.53)
Gasoline Fuel Tank	VOC	0.73 (0.81)	0.57 (0.63)
Frac Tanks	VOC	23.85 (26.29)	13.61 (14.96)
Brine Tanks	VOC	2.72 (3.00)	5.94 (6.53)
Fugitive Emissions	VOC	0.10 (0.11)	0.10 (0.11)
Air Eliminator	VOC	0.06 (0.07)	0 (0)
Emergency Generator	VOC PM_{10} SO_2 NO_x CO	0.24 (0.26) 0.24 (0.26) 1.10 (1.21) 8.11 (8.94) 1.86 (2.05)	0.01 (0.01) 0.01 (0.01) 0 (0) 0.26 (0.29) 0.05 (0.06)
Degas Plant	VOC PM_{10} SO_2 NO_x CO	1.60 (1.76) 1.26 (1.39) 0.35 (0.39) 13.89 (15.31) 17.52 (19.31)	0 (0) 0 (0) 0 (0) 0 (0) 0 (0)

5.3 Site Hydrology, Ground Water Monitoring & Public Drinking Water Protection

Ground water monitoring is performed at all 4 SPR sites to comply with the SPR Environmental Management system (EMS) Manual (ASI5400.55), and also in the case of the WH site, a state agency agreement. Salinity is measured and the potential presence of hydrocarbons is screened at all sites using TOC as an indicator. In addition, pH and temperature are taken along with the physical attribute depth to water for each well at each sampling episode. The overall monitoring scheme performed at West Hackberry is governed by an agreement between DOE and the LDNR to report annual ground water monitoring data through this document. At the Weeks Island, Louisiana site, long-term ground water monitoring has been accepted as complete as part of the state approved decommissioning plan. BM ground water quality is conveyed for a pond closure annually to the RCT via copy of this report. Wells surrounding the operating brine storage and disposal pond system at BH monitor groundwater as part of permit required leak detection. The St. James terminal has undergone and completed a remediation to satisfy state criteria for some limited historic crude oil leakage there and because follow-on studies indicated no further action required; no permanent ground water monitoring well system is indicated for the leased facility**.**

Available ground water salinity data collected for the past five years are presented graphically (Appendix C), for the historic site well nets and for the more recently installed Periphery Well (PW) series. These data are then discussed within each site-specific section and any gaps in data for the graphs are noted. The Y-axis has been standardized with appropriate exceptions noted at

either the 0–10 ppt or 0–100 ppt as the baseline dependent upon the historical range, providing easier comparisons among the monitoring stations.

Three of the storage sites have a long history of industrialized development primarily involving the mining of salt and associated minerals that were used for various purposes and as feedstock. A 10 ppt cut-off for salinity is used in this report for making comparisons for assessing affected and unaffected waters. This is not a regulatory limit but rather a value, given the setting, which represents usable versus unusable water. At BM, however, because of its particular site specific and historic mining conditions, a 20 ppt cut-off is employed for evaluating the generalized ambient shallow ground water conditions there.

5.3.1 Bayou Choctaw

The Plaquemine Aquifer, the main source of fresh water for the site through an Iberville Parish public connection and several surrounding municipalities, is located approximately 18 m (60 ft) below the surface and extends to a depth of 150 to 182 m (500-600 ft). The upper 18 m (60 ft) of sediment in the aquifer consists predominantly of Atchafalaya clay. The interface of freshwater and saline water occurs at a depth of 122 to 150 m (400-500 ft) below the surface on the dome. Ground water levels in the Plaquemine Aquifer are said to respond locally with the Mississippi River, flowing away from it during the high river stage and towards the river when in the low stage. Other, more predominant, local influences to the general site-wide flow patterns are manifested by structural features.

Historically, there have been four monitoring wells (BC MW1, BC MW2, BC MW3, and BC MW4) surrounding the brine storage pond at BC (Figure C-1). These wells were drilled roughly 9 m (30 ft) below land surface (bls) generally at the corners of the structure to monitor potential impact from the brine storage pond and any other potential nearby shallow contamination sources. Seven additional similarly screened wells were installed at various locations around the main site, and one off site near a selected brine disposal well pad. BC PW3 was plugged and abandoned in the original Verification Well Study (VWS).

These periphery wells (PWs) have now been added to the site's monitoring scheme to enhance evaluation of ground water flow direction and outlying salinity movements and variation. The CY 1996 Site Environmental Report contains a detailed overview of the Phase II (periphery well) studies of this site. An adjunct of these studies is the determination of an estimated linear velocity of the ground water movement within the shallow monitored zone. For BC the water in the shallow zone moves an estimated 1.2 to 2.4 m (4 feet to 8 feet) per year in a generally radial direction off the main site and underlying dome, loosely mimicking the ground contours (Figure C-2).

Ground water salinity observed at all of the four pond wells (BC MW1 through BC MW4, Figure C-3) has historically been above an ambient cut-off concentration of 10 ppt, somewhat high for a fresh water environment. This condition of elevated salinity is attributed to a previous owner’s salt water brine operational activities and possibly some more recent brine handling activities. Three of these wells (BC MW1, BC MW2, and BC MW3) exhibit 5-year traces this year that are either below or near the 10 ppt cut-off and the fourth well BC MW4, with the exception of 2011, has revealed a sub-10 ppt level since the last half of 2006. All four wells

exhibit seasonal salinity fluctuations that are affected by rainfall. Higher salinity values usually occur in late winter and early spring, and lower salinity measurements have been observed in late spring and summer (see traces BC MW2, BC MW3, and BC MW4, for their 2011 signature). Well BCMW3 continues to freshen indicative of the passing of a small saltwater plume from an historic brine piping release. BC MW1 now shows a flat five-year trace, having all of its measured values well below 10 ppt. This year after a long multi-year decline to below the 10 ppt cut-off, well BC MW2 began showing large salinity fluctuations (spikes and declines) returning, at times, to its historic highs, in two of the four quarterly measurements made in 2011, but has dropped below 10 ppt again for 2012.

Past surface brine spills and other activities from previous occupants of the area may have also affected the ground water salinity observed in these shallow wells. The long-term salinity range observed at well BC MW3, that had been much greater than that of the other three historical wells, appears to be returning to the ambient conditions more reflective of background, as observed with wells BC MW1 and BC MW2. Well BC MW4 located down gradient of the site and south of the E-W canal has a historic somewhat elevated overall salinity concentration, but the recent long-term time-series trending reflects a strong downward trace suggestive of the passing of a small saltwater slug. This trace began to change late in 2010 and has continued with wild swings into this year resulting in an overall upward trending appearance. This year's "wild swings" in salinity measurements has returned in all but two of the wells. Such swings have been observed in the past. Much of the variability exhibited with the earlier data may have resulted from over purging and inconsistently applied sampling techniques. However, use of low-flow sampling has aided the ground water testing by assuring more representative sampling. The return of the wide fluctuations may be a lag-time influenced response associated with the temporary break from prolonged drought to more normal rainfall conditions which began over a year ago.

Ground water surface piezometric data of all the wells indicate that ground water movement is radial in all directions from the high point on the dome around Cavern 15 and to the north. A north-south trending ground water divide is evident in the water level contouring, being controlled by a sink that has formed along the western edge of the site and in response to low water levels measured in the most easterly wells BC MW3 and BC MW4.

Long-term salinity trends have been tracked which, when examined within the context of the radial ground water movement, assist in identifying possible areas of or sources of salt water contamination. The 2012 keynote observation is the muting (or absence) of the large salinity swings historically prominent and as a result the 5-year traces are observed to flatten in appearance across the site. Even so, with such slow ground water movement being applied to a series of salinity values mostly below 10 ppt, small fluctuations can often cause the five-year trends to change direction (flip-flop) with a single year's data addition. With the large swings absent in most of the wells this year, we also see a pattern of more flattened traces in the salinity data. A discernable signature response muted in many of the wells was, however, noted again this year and coincides with the beginning of such behavior observed for three years running.

This year, well BC MW1, up gradient of the brine pond, flattened it's 5-year trace through the 2011 swings by notable freshening in 2012. Well BC MW2, the intercept well immediately

down gradient of the brine pond reveals a muted increasing five-year trace resulting from a return to lower salinities versus the wild swings experienced in 2011. This well shows the seasonal signature found in the pond well net, however, with the lower salinity values evident throughout the year, this well shall continue to be observed closely because of its downgradient position, but the lower numbers this year take it off the identified site "watch list."

Periphery well BC PW2 monitors an area of historical residual surface soil salt impact that has shallow ground water and this year's five-year trace continues to indicate a steady improving or freshening trend from 60 ppt to 40 ppt. This area is up gradient of and therefore not associated with the current brine pond operations.

Although it has in the past captured the most saline ground water on the site, BC MW3 is now exhibiting an essentially stable and decreasing trend. The slightly decreasing five-year trend varying around the 10 ppt cut-off is now revealing a continuing mild downswing trending despite the large swings of 2011. Former impacts from a historical 1991 brine piping leak appear to have completely passed this well now in a downgradient (southwesterly) direction.

Four of the seven PW well series wells indicate decreasing or flat five-year salinity trends. Well BC PW7 reveals a continued upward trace driven primarily by the 2011 swings in the data, even with the mild improvements noted in the 2012 data. In both the BC PW5 and BC PW6 locations (and plots) the current five-year trace is influenced by the omission of historical higher values found with the earlier annual samplings and also by the quarterly sampling regime now in-place. At the well location BC PW5 especially, this year's five-year window continues to trend has reversed from slight up to slightly downward presumably due to the loss of some earlier peaks in the historic dataset.

All of these monitored locations appear to fluctuate regularly over the entire period of record, but generally with decreasing trend lines and especially with decreasing variability for each well despite the occasional trend reversals noted in the shorter-term five-year windows presented. Future ground water data, including that from the periphery wells added from the Phase II verification studies and ongoing inspections of the brine pond and site piping, will assist in identifying any potential contamination originating from SPR activities. The shallow ground water monitoring well net for this site is adequately placed and sampled to serve as a complete site-wide detection monitoring system.

5.3.2 Big Hill

The three major subsurface hydrogeological formations in the BH site vicinity are the Chicot and Evangeline Aquifers and the Burkeville Aquitard. The major source of fresh water is the Chicot Aquifer, which is compressed from uplift and piercement over the BH salt dome. Fresh water in the upper Chicot Aquifer over the dome is limited from near the surface to a depth of -30 m (-98 ft) below mean sea level. The town of Winnie, situated off the dome and to the west, uses fresh water from the upper Chicot Aquifer. Beaumont and nearby Port Arthur both draw fresh water from the lower Chicot Aquifer.

Sampling of six monitoring wells (wells BH MW1 to BH MW6) around the brine disposal pond system (Figure C-4) began in 1987 and was converted to the low-flow method in May 1995.

Ground water contours from these and all of the Big Hill site monitor wells developed on fall quarter data are shown on Figure C-5.

The interconnected brine pond system is comprised of three contiguous PVC-lined above grade ponds (anhydrite settlement, oil recovery and brine ponds). All three have an under drain system contained within a surrounding slurry wall system keyed to an underlying clay bed. Commencing in August 2006, a renovation project to replace the liner material in the oil recovery and brine ponds in the series, was implemented. The project was completed there and the three-pond system was re-commissioned in August 2007. In 2012 an application was filed with the RCT to reline the anhydrite pond. This application was not acted upon before the close of the year.

Salinity data collected from the six permit required wells surrounding the ponds have for the past five years indicated complete consistency and absence of effects below detection limits until 2001 for well BH MW2 and BH MW5 after Ike came ashore in 2008, (Figure C-6). All values below the detection limit are specified as one-half the detection limit for statistical calculations. No ground water effects associated with the pond operation are evident since monitoring was begun in 1987. The salinity increase in BH MW2, up-gradient (northwest of) the ponds, is attributed to a previous release from buried brine header piping The freshening trend continued until Hurricane Ike forced a huge storm surge of saltwater from the Gulf that inundated the site. Several of the wells BH MW2, BH MW5, and BH PW4, were impacted by the saltwater pushed onto the site overtopping several well casings temporarily and allowing saltwater to infiltrate through permeable soils and also the breather holes in their caps. These three wells have shown remarkable recoveries during the time since Ike with well BH PW4 returning to BDL. The two pond-service wells are showing continued downward trending as the salt is slowly purged reflecting the limited impact to clear the salt water effects from the sandpack materials surrounding the screens with the routine low-flow sampling methodology.

Figure C-5 presents the contours of data obtained on a date in the fall quarter for all the site wells, as representative of 2012. The gradients and flow direction remain very similar to all of the previous contouring staggered throughout the calendar year in order to account for any seasonality. In the vicinity of the brine storage pond (wells MW1 through MW6) the flow is southeasterly. The overall basic shallow flow regime mimics the ground surface and appears to be moving radially off the underlying salt dome structure. This contouring appearance cannot be corroborated due to lack of control points off the site in a northwesterly direction. As with our other sites, it is suspected that regional flow regimes are locally modified by the underlying piercements.

Well BH PW5 located at the most up-gradient point of the site shows only a single spurious 1 ppt measurement and well BH PW4 near the southwest corner, below the closed mud pits, are the only two periphery wells showing any historical trace of measurable salinity on the site removed from brine pond monitoring service. At BH PW4, the trace had been basically characterized as flat and salt free except for a 1 ppt measurement made in 2005; a spurious value of 1.3 ppt was measured in 2007; and the 17 ppt spike at this very low (site elevation) position, when the well was inundated with salt containing Hurricane Ike storm surge in 2008. This well is only sampled

once per quarter by routine, even so, it's trace depicts a return to a pre-Ike BDL by the close of 2009.

The well BH PW2 was plugged and abandoned as part of the original VWS Study in the 1995/1996 timeframe and therefore is not depicted as an active well on the site well locator map.

5.3.3 Bryan Mound

Site monitoring wells screened in two water bearing zones, 6 and 15 m (20 and 50 ft) bls, indicate that no usable shallow fresh water exists in the uppermost inter-connected aquifer over the BM salt dome structure. This generalization was confirmed by the additional salinity data from VWS in 1995-96. However, the Chicot and Evangeline Aquifers are fresh to slightly saline in the Bryan Mound area, and fresh water for Brazoria County is obtained from the upper portions of the Chicot up gradient of the BM salt dome.

Fifteen monitoring wells were drilled at BM in four phases between 1981 and 1990 (Figure C-7). Wells BM BP1S, BM BP2S, and BM PZ2S have been removed from monitoring service due to casing damage. Five additional shallow well locations and one additional deep well were installed in 1996 as part of the VWS, and all of these have been incorporated into the site's monitor well net.

All five-year traces this year reflect only the low-flow sampling method which produces less data variability and which helps assure more consistent and representative sampling of the shallow aquifers across the SPR. The resulting trending graphs now more accurately reflect the Bryan Mound site's ground water conditions. Two of the 12 total shallow zone wells around the site reveal an increasing trend of saltier conditions for the current 5 year windows with two of the remaining ten freshening wells having a nominal flat trace. Two of the six total deep wells reveal a saltier trending this year. All remaining deep zone wells have reversed their five-year trends from flat to that of freshening. Well BM MW1D although located down gradient of a pre-DOE source had a series of decidedly downward 5-year traces probably due to the freshening data points from 2006 onward and the loss of lows back in 2003. The trend reversal noted last year was aided with freshening conditions continuing from 2007, and on into 2010 despite large swings in the dataset. The five-year trending is only slightly upward again this year through a series of extremely pronounced fluctuations in the dataset. The four quarterly 2012 values fluctuated less and around a level of 165 ppt producing a flat to slightly freshening trace for the single year.

Salinity trends are evident in both salt-affected and unaffected areas. Elevated ground water salinity measurements in both the deep and shallow zones near the former brine pond and pump pad area have, however, remained relatively constant over time.

After an overall step change in salinity evident in both the paired wells back in 1995, BM MW1S and BM MW1D, a decidedly consistent and similar freshening (downward) trend has been observed in both zones until the 2005 five-year trace where the deep zone well BM MW1D began trending upwards briefly, while the shallow zone well screened above it, BM MW1S, continued its consistent freshening. Both wells are currently showing large swings in their 5-year windows but the freshening trend remains for the shallow zone well and a slightly upward

trace has returned for the deeper set well of the pair. This may be the result of a slug of salty water slowly passing the position in both the wells. Water level measurements indicate that the two zones are hydraulically separate or very poorly connected with a large recharge event evident in the shallower well zone.

Salinity measurements (>20 ppt) observed in the shallow zone near the SOC (BM MW5) and the historic anhydrite disposal area are slightly decreasing despite many big salinity swings at the beginning of and near the end of the current five-year trace. These swings and trending are not indicative of any noteworthy releases (slugs) passing. A variety of salinity swings are found in this year's traces of the well pair BM MW2S and BM MW2D. The flattening of the trace occurring in the shallow well (MW2S) has overwhelmed the spurious spike of 2009. The trace in the deep well complement here has trended downward and become flattened as well around a 60 ppt level despite notable swings in the current 5-year dataset. This well pair reveals a hydraulic separation of 5.6 feet in downward direction (shallow well to deep well) in the fall timeframe contoured.

Salinity observed in the unaffected (<20 ppt) deep and shallow well pair at the northwest corner of the site (BM MW4S and BM MW4D) have reversed their upward trends now due to the freshening values observed since 2008. All of the measurements in both the shallow and deep well are below 10 ppt. The underlying deep zone well now is freshening but more slowly and at a lower overall salinity, indicative of differing waters, despite water level measurements not showing the pronounced hydraulic separation (water level difference) found with all the other deep and shallow well pairs on the site.

BM MW3 continues to show a slightly decreasing salinity trend over this five-year period due to stabilized salinity values all below the 10 ppt cut-off since 2011.

Site ground water movement in the shallow, 6 m (20 ft) bls, zone is found to be flowing radially (in all directions) off the dome with a ground water divide indicated this year along a line NE to SW (see Figure C-8). The flow direction in the deeper zone results from a NW-SE trending recharge zone causing flow to move in a northeasterly manner over half the site and in a southwesterly manner for the remaining half (see Figure C-9) again responding to the topographic expression of the underlying piercement. The water level data for the fall quarter of 2012 were contoured using the newly re-leveled measuring points from 2005 and again this year the data do not produce any dramatic changes in flow direction interpretation but reveal gradients that appear to have steepened on portions of the site near the edges of the dome. Recharge (rising water levels) in both the monitored zones and higher water levels in the adjacent lakes is noticeable this year.

Both of these aquifers exhibit a very low average linear velocity ranging from an estimated 1.5 m/yr (5 ft/yr) in the shallow zone to 3 m/yr (10 ft/yr) in the deeper zone. This slow movement is due to the combined effects of the clay content of the water bearing strata and very low hydraulic gradients which range from 0.0006 m/m to 0.001 m/m (0.002 ft/ft to 0.004 ft/ft). This low average velocity characteristic reduces the risk of contaminating any fresh and potable water bearing zones known to exist off the flanks of the subsurface dome.

When contoured, two major areas emerge where ground water salinity exceeds ambient conditions (>20 ppt) for the Bryan Mound site. The first area stretches from the former brine pond eastward to the brine pump pads and to the vicinity of an older brine pond demolished by DOE in 1989, and then southward towards the center of the site and below the maintenance building already discussed. Operations pre-dating DOE ownership included brine retention in two separate unlined elongated abandoned ponds reclaimed (filled) by DOE in this same area. The second and considerably smaller area lies southeast of the security operations center (SOC) adjacent to a closed anhydrite and drilling muds confinement area.

Elevated salinity observed at shallow monitor wells since their installation, BM PZ1S, BM MW1S, and former BM BP1S, has been speculated to be associated with old SPR brine storage pond. The large brine pond with a Hypalon® (chlorosulfonated polyethylene) membrane was originally constructed in 1978, and subsequently enlarged with installation of a new Hypalon® liner and a concrete weight coat in 1982. The BM brine pond was removed from service in September 1998 and closed in early spring of 1999. Because of the very slow ground water movement rates and the estimated long lag-time needed for vertical migration, the salinity measurements observed in the pond area and especially those to the northeast and east could be the result of seepage from before 1982 renovations of the pond, or from operations occurring before the SPR. Salinity of deep complements to wells BM PZ1S and former BM BP1S (BM PZ1D and BM BP1D) are much lower and considered ambient (<20 ppt) for the site. They indicate no contamination of the deep zone around the immediate vicinity of the former pond and no apparent direct communication with the shallow zone in this area. The shallow zone well BM PZ1S, the most directly down gradient well from the former brine pond, now reveals a slight decreasing trend. No significant overall shift is noted as the 2009 through 2012 data show a freshening tendency. The shallow zone well BM MW1S also maintains a steadily freshening 5-year trend even with large swings in the dataset evident in 2009 and continuing into 2012. Well BM BP1D, located south of the former SPR brine pond maintained a trending slowly downward this year, and overall remains below 20 ppt.

Data from the VWS completed in the summer of 1996 indicate that the primary location of shallow zone salinity impact is in the area of well BM MW1S, which is mirrored by elevated salinity in the underlying deep zone around BM MW1D. This is down gradient of the location of former below grade unlined brine retention ponds from operations that preceded SPR ownership. The high salinity of the deep well may also indicate some limited hydraulic communication of the two ground water zones occurring in or just up gradient of their location. Water levels confirm continued hydraulic separation but with a greatly increased head difference of about 5.2 feet versus last year's low number. However, the wells both reveal steady freshening indicative of a slow moving saltwater slug passing and dispersing.

Since, the former SPR brine pond was closed in 1999, the shallow ground water would have moved an estimated 65 feet laterally. Given the anticipated long lag-time for vertical migration and then the lateral distances required to reach the nearest wells, it is expected to be a considerable time for post-closure salinity changes to become evident in the annual monitoring.

Suspect historical brine contamination south of the site's maintenance building may be producing another area of elevated salinity. An active source has neither been identified nor

associated with any known historical SPR operations or incidents, and it therefore most likely predates SPR activity. Salinity measurements exceeding ambient levels (> 20 ppt) have also been observed historically in both zones at wells BM MW2S and BM MW2D, with the shallow well BM MW2S fluctuating at or below 10 ppt then experiencing a big swing in 2009 (spike and return) with subsequent data moderating to present. This area is masked when contoured, falling under the general "blanket" of the effects associated with the pre-SPR brining operations located in the north central portion of the site already described. This area may therefore be considered part of that historic saltwater release; being affected more by diffusion and dispersion rather than direct flow. The head difference here is downward between the two wells and the underlying zone is more heavily impacted (trending from 70 to 60 ppt) in this year's five year trace.

Salt water effects are not evident at the northwest corner of the site. Shallow zone monitor wells BM MW3S and BM MW4S near the southwest corner and west of the former brine pond, respectively, have historically remained relatively stable in the unaffected 5 to 10 ppt range. The ground water salinity at the northwest corner of the site is consistent or better than the salinity observed in Blue Lake, the adjoining surface water feature. The well pair BM MW4S and BM MW4D is also down to side gradient, respectively, of an onsite anhydrite disposal area and their data do not reveal any impacts.

5.3.4 St. James

The Chicot Aquifer is the principal regional aquifer at St. James. The upper strata of the Chicot Aquifer are in direct hydrologic contact with the Mississippi River. Much of the ground water contained in this aquifer is slightly brackish. In the St. James area only the uppermost units contain fresh water.

5.3.5 West Hackberry

The Chicot Aquifer, which occurs closest to the surface in the Hackberry area, contains predominantly fresh water with salinity increasing with depth and with proximity to the Gulf of Mexico. The majority of the ground water pumping from the Chicot Aquifer takes place in the Lake Charles area. Pumping is so great that a cone of depression has been created which has reversed the regional southerly flow direction towards the north in the vicinity of the coast below Lake Charles. The fresh/saline water interface is approximately 213 m (700 ft) bls off the sides of the West Hackberry dome and more shallow directly over the diapir where our site is situated. Possibly a result of the piercement by the diapir, laterally limited permeable water bearing soil found affected and monitored at the West Hackberry site is much nearer the ground surface, with a shallow sandy zone at roughly 6 m (20 ft) bls and a deeper more silty zone at roughly 15 m (50 ft) bls. Details provided by the VWS in 1996 indicate that the two zones contrast sharply in permeability, and as a result, their estimated linear velocity measurements are quite different. The range of linear velocity estimated for the shallow zone is from 50 to 200 feet of movement per year, which results from both a wide permeability range and varying gradients across the site. The deep zone exhibits a generalized velocity estimated to be only 7.5 feet per year (ft/yr), which is largely due to the more silty and clayey nature of the sands conveying these waters and the lower gradients evident within the site's limited well net.

Situated directly atop the salt dome and given the long industrialized history of the site and the immediate area, a 10 ppt cut-off for salinity is used in comparisons for determining affected and unaffected waters as historical ambient conditions have been found highly variable across the site.

The 1991 Contamination Assessment Report and Remedial Alternatives Analysis identified the former brine pond as a source of ground water contamination. The decommissioned brine pond was one of five adjoining ponds comprising a pond system and solids management system that handled brine and anhydrite solids pumped from the construction of storage caverns. Brine pond construction activity implemented per the state approved brine pond-decommissioning plan was concluded in November 1999.

Eleven monitoring wells and 15 former recovery wells (Figure C-11) have been installed on the WH site in five phases. All were historically used to either monitor or control brine contamination movement beneath the brine pond system. Salinity data gathered over the past five years at all wells is depicted in Figure C-14. Four of the seven wells originally installed for VWS were retained for additional water level measurement around the periphery of the main site, bringing the site total up to 30; in the late fall 2006 three wells which were not part of any outside monitoring agreement (WH RW1S, WH RW1D, and WH RW2D), were plugged and abandoned due to cap maintenance construction activity for a closed anhydrite pond, bringing the final site total wells down to 27. Salinity data are depicted in the five-year trending graphs for all of these wells, which are available in Appendix C; however, certain wells are tested for salinity only once per year per our 2002 site-wide monitoring proposal approved by LDNR in early 2004.

WH personnel began using the low flow technique for sampling all non-pumping wells in December 1995. Water level measurements from both zones for the fall quarter of 2011 have been reduced to elevations, contoured, and are presented as Figures C-12 and C-13, Shallow Zone and Deep Zone, respectively. The contour map of the water levels in the underlying deep zone reveals a rather flat pressure derived gradient within the semi-confined water bearing zone. The pressure gradient (potentiometric surface) is flat (low) across the site and continues to promote very slow travel times and indecisive travel paths beneath the site on this portion of the dome. The general appearance is that of a confined to semi-confined water bearing zone, receiving some recharge potential in the vicinity of wells WH P1D, WH P2D, and especially WH P4D, and with a potentiometric “sink” suggested with the measurements determined within the limited area bounded by the wells WH RW3D, WH RW4D, and WH MW1D.

Over the years the slug of saltwater seepage from the former brine pond, being removed from any source, has slowly changed its shape, growing somewhat smaller, and is drifting slowly towards the east. Of note this year, all the plume affected wells in the shallow monitoring zone: WH P3S, WH P4S, and WH P12S, all reveal downward (freshening) 5-year trending. The implication is that fresher recharge is slowly aiding with the diffusion and movement of the saltwater slug. The center of the slug is now found within a 40 ppt contour circumscribing the two wells: WH P3S and WH P4S, with 2012 average annual salinity values of 41.0 ppt and 41.7 ppt, respectively. The shape of the slug is oriented essentially N-S, which has been greatly influenced by the salinity reduction to BDL at the WH RW2S well location, and then also by the

freshening conditions occurring at well WH P3S. This is a very slow attenuation process primarily driven by dilution and diffusion. The regional drought has had an influence, especially with the shallow zone, although the basic flow regimes, shallow and deep, appear to remain fairly constant.

Well WH P4S is located on the southeast corner of the former brine pond within the main portion of the saltwater slug and this year's five-year trace moderating (becoming flatter and lower) continuing to show a downward trend of freshening. Overall, since 2001 the salinity levels have revealed a long history of big swings and resulting trend reversals. The big salinity swings now appear to be moderating and a more steady-state 5-year trace reflective of gradual dispersion and diffusion of the stratified saltwater is now evident.

The well WH P3S, in the center of the historic saltwater slug, is also beginning to show moderation in terms of the wide historical fluctuations and also in terms of producing a span of freshening five-year trends commencing in 2006. This well responded rapidly to pumping shut-in with the current series of traces reflecting consistent freshening and indicative of a more mature steady-state plug of saltwater that is slowly undergoing general dispersal driven by gradual down gradient ground water movement and as aided by diffusion. Wide salinity swings were also noted historically with both of the wells WH P2S and WH P3S as these were the only two where the high volume submersible pumps were used near the end of the recovery program.

Until sporadic spikes of elevated salinity were experienced with pond closure construction early in 1999, a slight decreasing salinity trend had been observed at wells WH P1S, WH P5S, and WH RW1S along the west side of the former brine pond. Each of the wells exhibited increased salinity due to closure construction that began to subside in 2000 and even more so since recovery cessation in 2001. In fact, former pumping wells WH P1S and WH P5S both began exhibiting salinity below the 10 ppt cut-off within 2002 with nearby well WH RW1S joining them in that range for 2004 and remaining so through 2005 until it was plugged and abandoned in November 2006 as part of the closed south anhydrite pond cap maintenance project. Well WH P13S remains aligned with this group by maintaining a series of five-year traces of BDL values and with a longer history of values below 10 ppt. Well WH RW2S also has joined the BDL group, presumably reflecting a long-term (lag time) favorable response to the same 2006 cap maintenance activity.

Many shallow wells exhibited an obvious salinity drop upon cessation of active recovery, indicative of fresher recharge and wells no longer pulling salty water through the formation to their screens. Relatively few (most notably hard pumped well WH P3S) responded with an abrupt salinity spike at shut-in. These wells were formerly pulling a fresher water mix across their screened length when actively pumping. This improving salinity response will undoubtedly be delayed to the wells on the east and situated directly in the core of the slug as the overlying salt impregnated soils slowly respond to the now diminished percolation and to the slow post-closure recharge.

Ground water salinity conditions over most of the site have continued to improve and have settled into long-term gradual freshening trends. As the five-year window for each well has progressed beyond the former recovery operations, the graphs reveal a more "quiet" shallow

zone monitoring regime similar to the response which began occurring shortly after the pond system was shut-in in early 1999 and then again when the recovery pumping ended in the spring of 2001. Shallow monitoring wells WH P8, WH P9, and WH P11 at caverns 8, 9, and 11, respectively, are located away from the former brine pond and intercept unaffected waters that are near ambient levels, comparable to up-gradient well WH P6S. Two of these wells (WH P8 and WH P11) have detected minor localized but historic impacts from former firewater line leakage and have since returned to ambient unaffected levels over the present five-year history. These two wells are tested only annually now for salt content per the approved monitoring plan.

Shallow zone monitoring wells WH P6S, WH P12S, and WH P13S, and deep zone monitoring wells WH P2D, WH P6D, WH P12D, WH P13D, and WH MW1D are nearer the brine pond than wells at the caverns and along the site's perimeter and with the exception of well WH P12S, also intercept ambient ground water. Well WH P12S is the only down gradient long-term [non-recovery] monitoring well that is affected by the shallow zone brine plume extending eastward from the former brine pond. Its salinity remains elevated (18.75 ppt annual average based on the 4 measurements in 2012) which is generally consistent since sampling began in 1992 (range 13 to 39 ppt, Std. D = 6.5 ppt, avg. = 25.69 ppt, n = 81). The overall trend since 1992 to present is slightly downward, however, the general short-term trace from 2002 to 2006 indicated a gradual rise for just that period. This year we see the salinity continuing to freshen and note that the 2012 annual average of 18.75 ppt remains below the historic average of 25.69 ppt. This freshening regime occurring so distant from the source and at the leading edge of the recognized brine plume (300 or more feet) coupled with the corresponding freshening found in well WH P3S located further up gradient and closer to the former pond; may be indicative of gradual long-term dissipation and dispersal effects on this historic saltwater slug. This well appears to be situated at the very edge of the diffusion "halo" of the recognized saltwater effects and, which now, with no pumping derived gradient, is undergoing natural dispersion and diffusion aided attenuation with time.

Well WH P12D, is the deep well complement to WH P12S, and has a long history of measurements below the 10 ppt cut-off. The early history of the well's traces included a long period of values below BDL (1 ppt); then a fairly rapid rise occurring in the years 2003 to 2004, presumably a lag-time response to the pond closure construction, was observed to peak around 7 ppt. The salinity then abruptly freshened throughout 2004 and has since presented a slow but steady rising salinity; from around 3 ppt to the present annual average for 2012 of 7.5 ppt. The climbing trend remains constant enough to warrant more closely watching the measurements and to also trying to deduce a reasonable explanation for the temporal influences at play. The impacts known for the deep zone wells is a smaller more and limited area found to the south of and to the west nearer well WH P4D, some 300 feet away. The head difference remains large (7.2 feet) between the two zones here and persistently in a downward direction based on the 12S and 12D water levels. The overlying shallow zone contains sufficiently high levels of salinity now, and also in the past, that cannot be ruled out as a potential source for the deep well's long-term trending. As such, the long-term freshening observed with the shallower WH P12S well could potentially promote a positive deep well response.

As defined in the final approved closure plan, the synthetic liner held in-place beneath the concrete weight-coat of the former brine pond was required to be pierced to preclude any future

concerns with long-term hydraulics. As a result, the salt-affected soils beneath this liner, presumably, shall continue to respond naturally to rainfall conditions and events.

5.4 Water Discharge Effluent Monitoring

The water discharge permit-monitoring program fulfills the requirements of the EPA NPDES, and corresponding states RCT Rule 8 and LPDES programs. All SPR point source discharges are conducted in compliance with these federal and state programs.

SPR personnel regularly conducted point source discharges from all sites during 2012. These discharges are grouped as follows:

a. brine discharged to the Gulf of Mexico;
b. stormwater runoff from tank, well, and pump pads;
c. rinse water from vehicles at specific locations draining to permitted outfalls;
d. effluent from package sewage treatment plants; and
e. hydrostatic test water from piping or tanks (LA only).

The SPR disposed of 12.95 million m^3 (81.44 mmb) of brine (mostly saturated sodium chloride solution with some infrequent discharges of lower salinities than normally attributed to brine) during 2012. Approximately 80.5 percent of the brine was disposed in the Gulf of Mexico via the BH (65.4 percent of the total) and the BM (15.1 percent of the total) brine disposal pipelines. The remaining 19.5 percent was disposed in saline aquifers via injection wells at the WH site (19.1 percent of the total) and BC site (0.4 percent of the total). These figures represent an overall major project-wide increase of brine disposal that translates to a more than threefold increase over the 2011 calendar year.

During 2012, 1,278 measurements and analyses were performed and reported to monitor wastewater discharge quality from the SPR in accordance with NPDES and corresponding state permits. With nine total non-compliances experienced in 2012, the SPR was in compliance with permit requirements for 99.45 percent of the analyses performed.

Parameters monitored varied by site and discharge. Separate tables provide specific parameters and the most frequent sampling interval (based on permit limitations). More frequent measurements are often made of certain parameters that assist with unit operations; these additional data are reported as required by the permits. The data measurement variation observed during CY 2012 is discussed in separate site specific sections.

Discharge monitoring reports (DMRs) are prepared and submitted in accordance with site-specific permit requirements. All discharge permits issued to the SPR require quarterly reporting to the appropriate agency(s) (LDEQ, or RCT and EPA). Should a noncompliance or reportable bypass occur during the reporting period, an explanation of the cause and actions taken to correct the event is included in the corresponding quarterly report.

5.4.1 Bayou Choctaw

BC personnel performed and reported a total of 53 measurements on permitted outfalls and reporting stations to monitor LPDES permit compliance during 2012. Table 5-11 provides the permit required monitoring parameters and limits for the BC outfalls. There were three permit non-compliances at BC in 2012 resulting in a 94.3 percent site compliance performance record for the year. The permit non-compliances for the SPR are summarized in tabulation in Section 3.

Most monitoring is related to water discharges regulated under the LDEQ Office of Water Resources LPDES permit. Discharges are from two package sewage treatment plants (STP), a permit limited vehicle rinsing station with the site's stormwater runoff from well pads, and pump pads (containment areas), addressed as a cross-reference to the LA MSGP and in the permit required SWPPP.

Table 5-11 Bayou Choctaw Outfall Sampling Parameters

Location/Discharge	Parameter	Frequency	Compliance Range
Sewage Treatment Plants	Flow BOD_5 TSS pH Fecal Coliform	1/6 months 1/6 months 1/6 months 1/6 months 1/6 months	(Report only, GPD) <45 mg/l Avg. <45 mg/l max 6.0 – 9.0 s.u. <400 col./100 ml
Stormwater (from former named/numbered outfalls)	Systematic Visual Observation	1/quarter (if discharging)	maintain written observations
Vehicle Rinsing (without soaps and/or detergents)	Flow COD TSS Oil and grease pH	1/quarter 1/quarter 1/quarter 1/quarter 1/quarter	Estimate in GPD ≤200 mg/l avg and ≤300 mg/l max ≤45 mg/l <15 mg/l 6.0-9.0 s.u.

5.4.2 Big Hill

During 2012, 647 measurements were performed reported to monitor NPDES and state discharge permit compliance. Table 5-12 provides the permit required monitoring parameters and limits for the BH outfalls. There were four total non-compliances during 2012 resulting in a 99.4 percent site compliance performance level. The permit non-compliances for the SPR are summarized in tabulation at the end of the section.

Water discharges at BH are regulated and enforced through the EPA NPDES permit program and the similar RCT discharge permit program (Rule 8). The discharges at the site involve brine to the Gulf of Mexico, hydroclone blow down into the ICW, effluent from the sewage treatment plant, and stormwater from well pads and pump pads. There were no discharges during 2012 from the hydroclone blow down system.

Table 5-12 Big Hill Outfall Sampling Parameters

Location/ Discharge	Parameter	Frequency	Compliance Range
Brine to Gulf	Flow Velocity Oil & Grease TDS TSS pH DO Biomonitoring Integrity Tests	Continuously Per flow 1/month 1/month 1/month 1/month Daily 1/quarter 1/year	0.27 million m3/day >9.1 m/sec (30 ft/sec) <15 mg/l max, <10 mg/l avg. (report only) (report only) 6.0 - 9.0 s.u. detectable (when using O_2 scavenger) Lethal NOEC 2.5% Offshore within 4% of onshore
Stormwater Outfalls	Oil and Grease TOC pH Salinity	1/quarter 1/quarter 1/quarter 1/quarter	<15 mg/l < 75 mg/l 6.0 - 9.0 s.u. <8 ppt
Recirculated Raw Water	Flow	1/month	Report only
Sewage Treatment Plant	Flow BOD_5 TSS pH	5 days/week 1/month 1/month 1/month	(report only) <45 mg/l max and <20 mg/l avg. <45 mg/l max and <20 mg/l avg. 6.0 - 9.0 s.u.
Hydroclone Blow down (not used)	Flow TSS pH	1/week 1/week 1/week	report report 6.0 - 9.0 s.u.

5.4.3 Bryan Mound

BM personnel made and reported 522 measurements on permitted outfalls for the purpose of monitoring NPDES and state discharge permit compliance during 2012. Table 5-13 provides the permit-required parameters and limits for the BM outfalls. There were no permit non-compliances resulting in a site compliance performance level of 100 percent for the calendar year.

Water discharges at BM are regulated and enforced through the EPA NPDES permit program and the similar RCT discharge permit program for state waters (Rule 8).

Table 5-13 Bryan Mound Outfall Sampling Parameters

Location/Discharge	Parameter	Frequency	Compliance Range
Brine to Gulf	Flow	Continuously	report only
	Velocity	Per flow	>9.1 m/sec (30 ft/sec)
	Oil & Grease	1/month	<15 mg/l max <10 mg/l avg.
	TDS	1/month	(report only)
	TSS	1/month	(report only)
	pH	1/month	6.0 - 9.0 s.u.
	Biomonitoring	1/quarter	Lethal NOEC 2.5%
	Integrity test	1/year	Offshore within 4% of onshore
Stormwater	Oil and Grease	1/quarter	<15 mg/l
	TOC	1/quarter	<75 mg/l
	pH	1/quarter	6.0 - 9.0 s.u.
	Salinity	1/quarter	< 8 ppt
Recirculated Raw Water	Flow	1/month	Report only
Sewage Treatment Plant	Flow	1/month	Report only
	BOD_5	1/month	<20 mg/l avg. and <45 mg/l max
	TSS	1/month	<20 mg/l avg. and <45 mg/l max
	pH	1/month	6.0 - 9.0 s.u.

5.4.4 West Hackberry

WH personnel performed and reported 56 measurements on permitted outfalls to monitor LPDES permit compliance during 2012. Table 5-14 provides the permit-required parameters and limits for the WH outfalls. There were no permit non-compliances during 2012 resulting in a 100 percent site compliance level.

The water discharges at the WH site were regulated under the EPA (NPDES) permit administered by the state of Louisiana under the LPDES permit program.

Table 5-14 West Hackberry Outfall Sampling Parameters

Location/Discharge	Parameter	Frequency	Compliance Range
Stormwater (Wellpads & Containments at Slop Oil Tank battery, slop oil tank booster pump pad, vehicle rinse station, brine storage tank area, High Pressure Pump Pad, Fuel Storage Area, Emergency Generator, Lake Charles Meter Station, and RWIS Transformer Area), Raw Water Test Discharges (incl. Non-contact Once-through Cooling Water and Diversion Water)	Visual Observations made in accordance with Sector P (SIC Code 5171) of the current MSGP	1/quarter	perform and record standardized observations and maintain onsite in accordance with the SWPPP and/or site instruction

Location/Discharge	Parameter	Frequency	Compliance Range
External Vehicle Rinsing/Washing	Flow (Daily Max) COD TSS O&G pH	1/quarter 1/quarter 1/quarter 1/quarter 1/quarter	Report est. (gpd) ≤200 mg/l avg and ≤300 mg/l max ≤45 mg/l ≤15 mg/ 6.0 to 9.0 s.u.
Treated Sanitary Wastewater	Flow BOD_5 TSS pH fecal coliform	1/6months 1/6months 1/6months 1/6months 1/6months	Report est. (gpd) ≤ 30 mg/l avg and ≤ 45 mg/l max ≤ 30 mg/l avg and ≤ 45 mg/l max 6.0 to 9.0 s.u. ≤ 200 col./100 ml avg and ≤ 400 col./100 ml max

5.5 Surface Water Quality Surveillance Monitoring

Surface waters of the BC, BH, BM, and WH SPR sites were sampled and monitored for general water quality according to the SPR EMP in 2012. Monitoring is conducted to provide early detection of surface water quality degradation resulting from SPR operations. It is separate from, and in addition to, the water discharge permit monitoring program.

Data and statistics are presented in tabular form, by site, in Appendix D, Tables D-1 through D-4. Observed values that were below detectable limit (BDL) were assigned a value of one-half the detection limit for statistical calculation purposes. In addition to commonly used summary statistical methods, the coefficient of variation (CV) treatment was incorporated to identify data sets with a high incidence of variation. Values approaching or exceeding 100 percent indicate that one standard deviation from the stated mean encompasses zero. This method draws attention to highly variable or skewed data sets for further evaluation. Extremely low values of CV (approaching or equal to 0 percent) indicate the standard deviation is small, relative to the mean, such as would be the case with very stable data, or if a preponderance of the measurements fell below the method limit of detectability.

5.5.1 Bayou Choctaw

Samples were collected and analyzed monthly, where possible, for seven surface water-monitoring stations. Monitoring stations A through G are identified in Figure D-1. Parameters monitored (Table D-1) include pH, salinity (SAL), temperature, dissolved oxygen (DO), oil and grease (O&G), and total organic carbon (TOC). A discussion of each parameter follows.

Hydrogen Ion Activity - The annual median values of pH for all the monitored stations ranged from 7.2 to 7.4 s.u., which is consistent with ambient conditions of the surrounding waters. The complete range for all measurements at all stations for 2012 is 7.0 to 7.8 s.u. Fluctuations observed are attributed to environmental and seasonal factors such as variations in rainfall, temperature, and aquatic system flushing.

Temperature - Observed temperature ranged from 5.3 °C to 27.3 °C. Temperature fluctuations were consistent among all stations and are attributed solely to meteorological conditions since the BC site produces no thermal discharges.

Salinity - Average annual salinities in 2012 ranged from 0.5 ppt (indicating below detectable limits) to 2.0 ppt at (Stations B and C). Wetland stations A, E, and G revealed below detectable limits throughout the year in their respective databases. Six total measurements above BDL were shared at stations A, B, C, D, and F, with stations C and F receiving two each. Station C is situated in the wetland waters subject to variable conditions (highest CV of all stations). Low water conditions may have influenced the salinity readings this year. It is believed that the remainder of the values are a response to the return of a near normal rainfall pattern for the region.

Oil and Grease - Ten separate quantifications above BDL for O&G were spread amongst the seven reporting stations. This basically means that for 2012, O&G levels were found to be measurable in 48 percent or less than half of the samples taken over the year at all of the stations. No definitive source is identifiable nor did any oil spillage occur at the site; and the levels measured are too small to result in producing a visible sheen or reportable quantity. The total range in the measurements was from BDL to 7.0 mg/l, with each station quantifying O&G in one or two of the quarterly sampling episodes.

Dissolved Oxygen - Overall, DO average and median levels are relatively low (below a suggested minimum threshold <5 mg/l supportive of aquatic life). The range for all stations is 0.9 mg/l to 7.1 mg/l, with annual means and medians for all stations ranging from 2.6 mg/l to 4.3 mg/l. These low numbers are attributed to high temperature and high natural organic loading combined with low flow and minimal flushing typically observed at times in the two wetland area stations. Peak levels over 6.0 mg/l at stations B, and F are attributed to increased primary productivity.

Total Organic Carbon - Average annual TOC concentrations ranged from 6.6 to 8.9 mg/l. High TOC readings typically correlate with high organic loading that is usually found in stagnant or sluggish water bodies of limited volume, such as an evaporating pool of water. The highest value measured was 16.0 mg/l occurring at Stations D, and G suggesting low flows to stagnant water for several months as Station G also had the highest average TOC for this year. The relatively low values observed around the site sampling locations as well as the peaks produced no discernible physical impacts and are not out of line with the natural setting or system receiving episodic rainfall.

General Observations - Based on the above discussion, the following general observations are made regarding the quality of BC surface waters.

- The surrounding surface waters continue to have a relatively neutral to slightly basic pH, with infrequent more basic excursions attributable to a localized flushing (runoff) action with the episodic rainfall.
- Observed salinity measurements remained generally low and within the historical range.

- Temperature variations were caused by seasonal changes. There are no thermal processes used at any SPR site.
- Low minimum and annual average DO levels are attributed to high temperatures and organic loading resulting from low flow and minimal flushing typically observed in backwater swamp areas.
- This year all stations reported measurable oil and grease levels. The highest measurement (7.0 mg/l) is not enough to produce a visible sheen. The values, although numerous about the site, are not indicative of any relatable spill events at the facility, as no oil releases occurred during the year. These data do, however, reveal a slight improvement over the number of occurrences (shows) in the database when compared to last year.

5.5.2 Big Hill

Monitoring stations were established at five locations (Figure D-2) to assess site-associated surface water quality and to provide early detection of any surface water quality degradation that may result from SPR operations. It must be noted that Station A has only minimal sampling coverage again this year. Because this sample point is located at an overflow point to a former onsite stock pond that first receives the site's treated effluent, it has become rare that a monthly flowing surface water sample can be taken due to low rainfall and the infrequent batching from the sewage treatment plant. Parameters including pH, temperature, SAL, O&G, DO and TOC were monitored (Table D-2).

Hydrogen Ion Activity - The 2012 data show the pH of site and surrounding surface waters remained between 6.6 and 8.3 s.u. The annual median values of pH for each of the monitored stations ranged from 7.1 to 7.5 s.u. and indicate that in general the area waters sampled became slightly more acidic versus last year's readings.

Temperature - Temperatures observed in 2012 ranged from 11 °C to 32 °C exhibiting the characteristics expected from seasonal meteorological changes. All stations reported very similar ranges and temporal fluctuations throughout the year.

Salinity – Long-term average annual salinities are usually quite low for the BH stations and physical setting and the individual monthly tests typically range from fresh on the site all year long to a maximum, usually in the upper teens, associated with the tidally influenced RWIS location on the ICW (Station C) nearest the Gulf. Because of its location, Station C also routinely has a higher mean and a higher median salinity as compared to the other stations. This year all stations reported acceptably low variation salinity data with the CV values all well below 100 percent. However, the means at all locales dropped (freshened) somewhat versus 2011. This observation may be related to some relief from the persistent drought conditions that plagued the area throughout 2011. The short duration but more frequent rains tend to flush and dilute observed salt contents.

Two of the stations (A & B) which are closest to the main site and furthest from the coast produced numerous BDL measurements in their respective datasets; with the remaining three stations revealing improving (less salty) conditions. Station A was capable of producing flowing

samples in 8 of the 12 months this year, an improvement of 20% over 2011, and was the only station to produce 100 percent BDL for the measurements obtained. due to drought.

Oil and Grease - Two oil & grease values were found above the historic detectable limit of 5 mg/l this year. No indication of oil impacts from SPR activities was found or observed during any of the sampling episodes. Station A had only three of the quarterly O&G samples this year due to low water or non-flowing conditions. Station C had a single value of 9.3 mg/l and Station E had a value of 6.9 mg/l.

Dissolved Oxygen - Dissolved oxygen generally is greatest in the winter and spring and lowest from summer through fall. DO peaks were observed in the months of December through February and the lowest values were determined in the summer to early fall generally in the August to November timeframe this year. The lowest variability of a full 12 month set of data points was found at the RWIS measuring point of the ICW (Station C) with a CV value of 13.7 percent where the general size of the water body is expected to impart a more consistent dissolved oxygen level that the testing embellishes and although the variability is the most modest, it is not without variation in the year. The station with the most DO variability during the year was sampling station D with a CV of 59.9 percent, however, only half (six) of the 12 monthly samples could be taken due to non-flowing conditions during the year. The overall range in DO this year is found to be 1.9 mg/l to 11.0 mg/l with a mean range of 4.0 mg/l to 6.0 mg/l from all tests and stations. None of the monitoring stations produced samples during the year with DO levels below 1 mg/l. Levels below 1.0 mg/l cannot be expected to support much aerobic life; values below 2.0 mg/l generally define anoxic conditions. The low values were not persistent and may be associated with varying degrees of flushing, peak primary production, or both.

Total Organic Carbon - Average annual TOC concentrations varied from 11.3 to 24.8 mg/l over the year at the five monitoring stations. The range in TOC from all samples is 5.4 to 44.7 mg/l. Stations A, D, and E had noticeably higher levels of TOC than other stations. The consistently higher TOC levels observed are believed to be a result of intermittent reduced flushing (dry spells) combined with higher organic loading reaching the receiving waters and stagnating off and on throughout the year.

General Observations - Based on the above discussion, the following general observations are made regarding the quality of BH surface waters.

- The fresh surface waters have a slightly basic tendency this year in terms of the range of median pH, with the receiving waters tested showing a tendency to be slightly more acidic than in 2011, both in terms of median values and overall range.
- The observed salinity measurements were lower on the site and increased in natural fashion from fresh water at the site to an intermediate brackish and highly variable water regime at the ICW. The flushing action occurring post-Hurricane Ike, appears to have concluded, and at least temporarily, the more frequent rainfall diluted and freshened the salt content in many of the sampled locations this year.

- Surrounding surface waters were neither contaminated nor affected by SPR crude oil with only two O&G measurement made from the five stations monitored. These low values were not persistent nor caused any discernible impacts.
- Temperature variations followed seasonal meteorological changes.
- In general, low dissolved oxygen and high total organic carbon fluctuations were within typical ranges indicative of seasonal meteorological and biological influences for such a setting and range of environments. DO levels did not drop below 1.9 mg/l this year and TOC values did not rise above 44.7 mg/l. Both of these values are noticeable natural improvements in their own versus last year's datasets.

5.5.3 Bryan Mound

Surface receiving waters surrounding the BM site were monitored during 2012. Blue Lake has seven sampling stations and Mud Lake has three established stations. Surface water monitoring stations are identified in Figure D-3. Stations A through C and E through G are located along the Blue Lake shoreline to monitor effects of site runoff. Stations H and I are located along the Mud Lake shoreline to monitor effects of site runoff. Stations D and J, located further from the site, serve as controls. The results from these controls will not be included in the analysis, but will serve as references.

Parameters monitored in the BM surface waters include pH, temperature, salinity, oil and grease, dissolved oxygen, and total organic carbon (Table D-3). Mud Lake water levels were high enough this year to accomplish 7 monthly sampling events which is the same as with 2010 and Blue Lake had water levels high enough for sampling in only 5 of the 12 months.

Hydrogen Ion Activity - In 2012, the pH range for Blue Lake and Mud Lake stations was from 6.3 to 8.4 s.u. for the combined datasets. The control point for Blue Lake produced a similar range of 6.6 s.u. to 8.2 s.u. The range for the Mud Lake control was 6.5 to 7.9 s.u. The results reveal a slightly basic condition for Blue Lake, and slightly more acidic for Mud Lake, while also proving an analogous condition for the controls. These data are indicative of natural waters devoid of carbon dioxide and generally hard in regard to mineral content. Marine and brackish waters, such as those in Blue Lake and Mud Lake, typically have somewhat elevated pH levels and high mineral content. The pH fluctuations measured this year are comparable to the normal range of variability historically seen at the BM site.

Temperature - Temperatures observed in 2012 ranged from 17.1 °C to 32.2 °C and reflect a complete set of monthly ambient surface water testing in Blue Lake and nearly a full range of seasonal samples for Mud Lake. The observation can be made, however, that the range of fluctuations are attributed to meteorological events.

Salinity - Observed salinity fluctuations ranged from 4.7 ppt to only 6.1 ppt in Blue Lake and from 3.7 ppt to 31.0 ppt in Mud Lake. Salinity fluctuations are attributed to meteorological and tidal conditions rather than site operations, since salinity observed at control sample stations D and J varied consistently with those found along site shorelines. The higher salinity values in Mud Lake are primarily caused by the strong tidal and wind influence on the lake, its more direct

link with the nearby Gulf of Mexico through the ICW. This year's datasets indicate a return to a persistent drought pattern for the area.

Oil and Grease – All samples at the eight stations and two control locales were below the detectable limit (5.0 mg/l) displayed as 2.5 mg/l for statistical calculations. These data favorably reflect continued good site housekeeping and effective site spill prevention, control, and response efforts.

Dissolved Oxygen - During 2012, DO was measured from eight times at each Blue Lake station to nine times at each of the Mud Lake stations during the year. The two lakes produce differences in oxygen content that vary opposite to the variation in salinity. Mud Lake is tidally influenced with regular inflows of estuarine/Gulf waters slightly lower in DO concentrations; whereas, Blue Lake, reflecting a fresher regime, typically would be expected to have a higher oxygen carrying capacity. This year the higher means and median DO levels are those found in Blue Lake, and also higher maximum values than those observed in Mud Lake. Fluctuations in DO levels in each lake are consistent with their respective control points. All measurements indicate "no apparent impact" from SPR operations. Blue Lake means and medians that range from 9.0 mg/l to 10.8 mg/l and 8.0 mg/l to 12.1 mg/l respectively, verify that overall DO levels were adequate for aquatic life throughout the year. Mud Lake's lowest DO measurement of 1.0 mg/l, was about the same as Blue Lake's low of 1.1 mg/l this year; however, means for the Mud Lake stations were above 6.1 mg/l and medians were found above 4.1 mg/l support the likelihood that lower DO levels although not unheard of, are infrequent, and that Mud Lake must receive a higher degree of overall mixing that may be an influence on the available DO for the water body.

Total Organic Carbon - In 2012, all 63 TOC measurements of Blue Lake ranged from 14.8 to 38.5 mg/l. The 17 TOC observations made at each of the two Mud Lake stations beyond the control were somewhat lower ranging from 8.2 mg/l to 20.7 mg/l. Both control points have results that are similar to their respective lakes. The TOC levels observed in both lakes, however, are indicative of healthy, unaffected ambient conditions.

General Observations - Based on the above discussions, the following general observations are made regarding the quality of BM surface waters.

- The observed pH was stable for the period tested and slightly basic in both Blue Lake and Mud Lake, but typical of brackish waters. Of the two receiving waters, Blue Lake was slightly more basic again this year based upon somewhat higher measurements being taken at the more numerous Blue Lake stations.
- Temperature and salinity fluctuations observed during the period tested are attributed to meteorological and tidal conditions rather than site operations.
- TOC is found to be about the same in both receiving waters this year.
- The dissolved oxygen level measured in both Blue Lake and Mud Lake was within typical ranges indicative of seasonal, meteorological, and biological influences for such a setting and environment and overall were found to be somewhat higher in both lakes in

2012 versus 2011. The overall lower levels of DO in Mud Lake versus Blue Lake appear to fit the salinity levels this year.

5.5.4 West Hackberry

In 2012, six surface water quality stations (Figure D-4) were monitored monthly at WH. Parameters monitored (Table D-4) include pH, temperature, salinity, dissolved oxygen, oil and grease, and total organic carbon.

Hydrogen Ion Activity - The pH of surface waters ranged between 5.2 and 9.7 s.u., and annual median values ranged from 7.2 to 7.7 s.u. from all stations. The ambient waters measured were slightly more acidic in overall range than last year's data. Station D, sampling main site run-off produced the highest median value this year with a 7.7 s.u. Station D, also produced the highest single value of 9.7 s.u. for all stations. Although the travel paths and long but intermittent travel times over crushed limestone placed for erosion control and traffic ability would tend to raise pH levels, the rainfall events of 2012 reduced that tendency. Fluctuations of observed pH were relatively minor and could only be attributable to environmental and seasonal factors such as variation in rainfall, temperature, algae and biotic growth, aquatic system flushing and the buffering effects of crushed limestone gravel on slightly acidic rainfall.

Temperature - Observed temperatures in 2012 were consistent with observations at other sites and were indicative of regional climatic effects. No off-normal measurements were observed. Recorded temperatures ranged from 13.0 °C to 32.0 °C and were found very consistent among stations.

Salinity - Meteorological factors such as wind, tide, and rainfall contributed to the salinity variation observed in brackish Black Lake (Stations A, B, and C) and the ICW (Station F). Salinity ranges observed in these water bodies (4.9 to 21.7 ppt in Black Lake) and (BDL(no salt) to 20.7 ppt in the ICW) are more conducive to supporting euryhaline organisms with variable salinity tolerance and those with sufficient mobility to avoid salinity stresses that occur with seasonal changes. Station F on the ICW reflected a wider range due to the influences of the tides and proximity to diluted but saltier Gulf waters. However, mean annual salinity observed at the ICW (8.9 ppt) was lower than stations in Black Lake (12.4 to 12.8 ppt) due largely to the fresher water influences received from more northerly drainage ways to the ICW and brackish water with limited movement to or from Black Lake. Main site Stations D and E had the lowest salinities, with 24 out of 24 samples being BDL. Salinities observed at these two upland site stations were salt free this year possibly reflecting a season with no brackish storm surge at the site or more complete flushing from the last major storm events. In general it may be said that the salinity measurements this year are in an overall sense lower than those taken at site stations in 2011 and this may be related to more abundant rainfall throughout the year.

Oil and Grease – Observed O&G levels were below the detectable limit (5 mg/l) for all six monitoring stations for all samples taken during 2012. These data are reflective of effective spill prevention and good housekeeping practices being maintained by site personnel.

Dissolved Oxygen - Minimum DO levels were at concentrations that support aquatic life, ranging from 4.3 to 14.8 mg/l from all stations. Dissolved oxygen was most variable at onsite Station D as opposed to the open and flowing receiving water stations. Since all other

parameters have similar patterns with the other stations, Station D's variable and wider ranging DO values can be attributed to natural factors, such as aeration and biological oxygen demand. Station E, this year, produced the lowest single measurement (4.3 mg/l) and Station D, the single highest value (14.8 mg/l). Greater surface area and water movement through currents and wave action always provide continuous aeration of the lake and ICW water. Mean DO values ranged from 6.7 to 9.8 mg/l across the six sampling stations.

Total Organic Carbon - TOC concentrations for 2012 ranged from 2.6 to 17.6 mg/l with site stations D and E experiencing both the highest and lowest single values of all the stations this year. This range is not out of line with the nature of the water bodies and is very consistent with the measurements obtained during the year at all Black Lake stations. The average annual TOC concentrations by station ranged from 4.3 to 9.1 mg/l with station (D) experiencing the most variability and the largest range throughout the year. Because the variation is so consistent among the remaining stations, and especially so for the Black Lake stations, it is indicated that these measurements reflect a return of near normal rainfall to Black Lake and the surrounding environs.

General Observations - The following observations are made, based on the above discussion, concerning operational impacts on the WH aquatic environs.

- pH and temperature were observed within ranges routinely expected from the archival history, setting and conditions experienced in the year. Measurements of pH from all stations remained fairly stable, and in general, the waters remained slightly basic. The measurements and observations made appear to be reflective of the return to more abundant coastal derived rainfall and the typical seasonal influences.
- Detectable salinity levels were found mainly in Black Lake and the ICW. The salinity measurements made throughout 2012 were consistent with the ambient and slightly brackish receiving water environment, reflective of the return of abundant coastal derived rainfall to the area.
- Oil and grease measurements are made quarterly throughout the year by routine in order to include seasonality in the dataset. Historically, the O&G tests here are typified by BDL measurements. The site maintained a complete BDL record at all stations and for all samples made during the year. This is reflective of a focus on good housekeeping associated with all operations and a high degree of attention on spill prevention.
- All dissolved oxygen levels at site and Black Lake stations were consistently high and do not appear adversely affected by site operations. Onsite stations D and E produced the highest and lowest levels of all stations and also the higher mean and median resulting in higher variability and larger range. None of the data from either locale suggest any impact or effects from SPR operations.
- Total organic carbon concentrations were quite similar at all stations with the exception of station D throughout the year suggesting no substantial transient bio-contamination or ecological events. The increased variability observed at the onsite drainage stations (D and E) results from the wider range of the values found (D and E had the highest value and lowest value respectively) of all sample locations during the year but nothing indicative of any impact, insult or impairment.

5.6 Waste Management

The waste minimization program reduces the generation of all wastes including hazardous, non-hazardous sanitary, and E&P wastes.

The SPR successfully met their hazardous and non-hazardous sanitary waste generation targets by generating less than 400 lbs. and 600,000 lbs. respectively during CY 2012. DM environmental staff members were able to assist in this success by a thorough review of the potential waste streams, evaluation of recycling alternatives, communication with SPR personnel, and consultation with federal and state regulatory agencies as required. Materials recycled during CY 2012 are delineated in Table 5-15.

Table 5-15 SPR Recycled Materials

CATEGORY	RECYCLED (LBS)	RECYCLED (METRIC TONS)
Aluminum Cans/Plastics	1,784	0.81
Antifreeze	207	0.09
Ballasts	563	0.26
Batteries (all types)	1,893	0.86
Blast Abrasives	505,610	229.34
Capacitors	246	0.11
Electronics	30,724	13.94
Fuel/Oil Filters	222	0.10
Office Paper and Cardboard	155,954	70.74
Scrap metal	168,706	76.52
Soil	1,305,000	591.94
Spent bulbs/lamps	1,281	0.58
Toner Cartridges	1,998	0.91
Used Oil	15,759	7.15

5.7 Chemical Management

All people using chemical containing products on the SPR are required to choose chemical products that are approved and listed on the Qualified Products List (QPL). The QPL is used to control and limit the quantity of toxic constituents found in chemical products, and also the potential for the generation of hazardous waste generated on the SPR.

Personnel requesting chemical containing products forward the MSDS to the Chemical Management Specialist who reviews the product for potential impacts to the environment, adherence to green requirements in the SPR Building Specifications for paints, adhesives, sealants; recycled content in materials; and exclusion constituents that contain EPA's 17 High Priority Toxic Chemicals.

The Chemical Management Specialist confers with the Industrial Hygienist regarding concerns he may have from a health and safety standpoint; and with the Waste Management Specialist to discuss the potential for waste generation that might occur from the use of the requested materials. If necessary, the Water or Air Specialist may also be brought into the review. The sub-contractor or site personnel are contacted when additional information is needed as to the proposed use of or quantity needed for the job. If the product is rejected for use, an environmentally acceptable substitute is presented.

The goal is to approve products that reduce the quantity of toxic constituents in cleaning chemicals, reduce VOCs in paints, adhesives, sealants and solvents, and manage the toxicity of rodenticides.

In recent years cleaning products, sealants, adhesives, and paints have been found to cause health problems to building occupants and cleaning crews, including increased asthma episodes and allergy symptoms, and the development of dermatitis caused by chlorine and other chemicals in cleaning products. By approving environmentally acceptable chemicals indoor air quality is improved; and the work environment is healthier.

The SPR Chemical Management Program is successful in restricting use of chemical products to those that are more environmentally friendly. One of the key tools to select chemical products is the SPR QPL.

5.8 Pollution Prevention

The SPR's Pollution Prevention program integrates P2 activities into all SPR operations to minimize risks to the environment. All SPR employees have P2 responsibilities under this program as every employee generates waste which must be appropriately managed. A few of the many ongoing successful SPR P2 projects include paper use reduction, sanitary waste diversion, paint waste elimination, exploration & production (E&P) waste recycling, sustainable acquisition, and spill prevention.

FY2012 saw a considerable increase in SPR well drilling and workover activities which have potential to generate huge volumes of waste, much of it hazardous. By properly managing the projects on the front end, zero hazardous drilling wastes were produced. Contractor waste management plans and controlled use of approved chemical products with less environmental impact were critical to the success of this accomplishment.

SPR P2 also includes after hours volunteer outreach activities. During 2012 SPR employees participated in Christmas tree recycling to restore coastal marshes, Carnival bead recycling to support area non-profit organizations, seed planting demonstrations at local schools, and beach sweep events to prevent debris from washing into waterways and onto beaches.

P2 announcements and suggestions are communicated via the SPR's quarterly newsletter "ESPRIT", and routine email distributions including pertinent local information and useful web links. These communications are published on the DM Environmental webpage, which is available to all SPR employees. In 2012, the SPR continued its aggressive integration of the P2

and EMS programs into its business operations, providing both cost savings and pollution reduction.

5.9 Sustainability

The SPR Sustainability Program was initiated in 2007 with the advent of EO 13423 and broadened in 2009 with EO 13514, but it has never been a unique and separate program. It focuses on resource conservation and pollution prevention, so it includes the objectives of the air, water, waste, and chemical management programs that were well established prior to 2007. Like the other programs, the sustainability program is planned, implemented, monitored and measured, evaluated, reported, and improved through the SPR EMS.

Many SPR sustainability goals – identified as "objectives" in the EMS – were created during the initial development of the SPR EMS, after evaluating SPR activities and recognizing the environmental aspects of these activities that must be controlled. These are referred to as SPR-specific "institutional" objectives. Other sustainability goals identified and mandated by the executive orders were included in the EMS in 2007 and 2009. All goal/objectives and their targets are called "performance measures" and are discussed as follows.

Forty-six performance measures were tracked by the SPR EMS in FY 2012. A target (preferably a metric that can be measured) is established for each objective. Some objectives have two targets, a "minimum" level that all DOE contractors should meet and a more challenging "stretch" level.

Performance measures are either discretely identified in the M&O contractor's contract Work Authorization Directives (WADs) as contract objectives, or they support the WADs, or they are delineated by the goals of Executive Orders 13423 and 13514.

Performance measures are agreed upon for each fiscal year by DOE and the M&O contractor and tracked for success. Some focus on specific disciplines, such as the Environmental or Emergency Management departments, while others involve all disciplines. All performance measures were related to significant environmental aspects or interests to top management.

Refer to Tables 5-16 and 5-17 for a synopsis in meeting performance measures. Institutional performance measures have been monitored and measured annually for more than 7 to 11 years. They are based strictly on SPR-specific environmental aspects. Of the 20 institutional performance measures tracked in FY 2012, 19 were met or surpassed at the more challenging stretch target level. One did not meet the stretch target (ID # 19 in Table 5-16) but surpassed the minimum target.

Table 5-17 delineates the performance measures that support the sustainability goals of Executive Orders 13423 and 13514. Of the 26 performance measures (six of which are also considered institutional) tracked in FY 2012, 10 were achieved, 13 were progressing toward achievement, and 3 had not yet shown progress.

Table 5-16 FY 12 Institutional Objectives & Targets with Performance

Number	Aspect(s)	Objective	Target		Performance	Success
			Minimum	Target		
1	Spills/Releases, Discharges	Reduce permit exceedances reported on Discharge Monitoring Reports	No more than 8 annually	No more than 4 annually	3 in 2012	Last exceeded the minimum in 2000, steady success meeting target since 2001
2	Spills/Releases, Discharges, Air emissions, Environmental Monitoring, Natural Resource Preservation, Public Involvement	Avoid cited Clean Water Act, Clean Air Act, and RCRA (waste) enforcement actions(notices of violations)	Not applicable	0 per year	Zero	Zero Since FY00
3	Spills/Releases, Discharges	Reduce reportable occurrences of releases from operational facilities	≤6 /year	≤4/year	2 in 2012	Steady performance meeting the target of better since 2000
4	Waste	Reduce total amount of hazardous waste generated	Not applicable	≤400 lbs/year	177 lbs in 2012	Target is annually reduced – Waste generation decreased greatly in 2005 –remains well within target range.
5	Waste	Reduce total amount of “sanitary” waste generated	Not applicable	<600,000 lbs/year	337,132 lbs in 2012	Target is annually reduced – and performance is consistently far below the target.
6	Waste	Increase recycling of “sanitary” waste through waste diversion	Not applicable	58%	60% in 2012	Target is annually increased – and consistently met or exceeded.
7	Green Procurement	Increase purchasing of EPA designated recycled content products (Affirmative Procurement)	Not applicable	100%	100% in 2012	Since 2000, steady performance meeting the target with only 3 years only slightly below the target.
8	Green Procurement	Increase purchasing of bio-based products.	Not applicable	100%	100% in 2012	100% since inception in 2007

Number	Aspect(s)	Objective	Target		Performance	Success
			Minimum	Target		
9	Waste	Increase use of the Qualified Products List (QPL)	Not applicable	100% of products sampled for QPL compliance	<100% in 2012	Although only slightly below target, consistently unable to meet 100% QPL target.
10	Waste, Spills/Releases, Discharges, Air Emissions Resource Use	Review all P.R.s, designs, SOWs, and other documents submitted for Environmental review.	Not applicable	100%	100% in 2012	100% since 2001
11	Environmental Monitoring	Submit environmental documents on time to DOE & Regulators (timeliness and quality)	Not applicable	100%	100% in 2012	2000 = 98% 100% since 2001
12	Spills/Releases, Discharges, Environmental Monitoring	Submit annual Pipeline Integrity Report by October 31st for previous fiscal year.	Not applicable	On schedule	Submitted on time	On schedule since 2000
13	Spill/Releases, Discharges	Ensure key emergency equipment is available	90%	100%	100%	100% since 2000
14	Spill/Releases, Discharges, Fire	Ensure BOAs are in place for spill response and clean up at each site.	At least 1/site	At least 2/site	Surpassed target – each site has 3 BOAs for spills. They expire 12/31/13.	Greater than Target since 2001
15	Spills/Releases, Discharges, Fire	Ensure emergency preparedness and response capabilities through quarterly training ERT members.	95% ERT trained/site	100% ERT trained/site	100% in 2012	Only 3 times since 2000 the target was not met.
16	Spill/Releases, Discharges	Successfully complete PREP drills / exercises.	Not applicable	100% PREP objectives tested/site/yr	100%	Tracked since 2005. 100% for regulatory compliance.
17	Public Involvement	Plan and administer an effective community outreach program. Complete community outreach activities using the Annual DOE SPR Public Outreach Plan as a baseline.	Complete all activities in accordance with the plan	Complete activities in addition to those planned	100% in 2012	Steady performance meeting or exceeding the target since 2002

Number	Aspect(s)	Objective	Target		Performance	Success
			Minimum	Target		
18	Natural Resource Preservation	Provide habitat on site to protect wildlife. This is a 3-year objective achieved by the end of CY09 for Clean Texas.	Not applicable	≥92.7 acres total, BC = 8 acres, WH = 37.7 acres, BH = 2 acres, BM = 45 acres	Maintaining Target	Target surpasses the 2004-2006 achievement of 77 acres. Improved since 2004 inception. Steady since 2007. Will maintain performance into future.
19	Spills/Releases, Discharges, Air Emissions, Waste	Meet weighted average (MPAR) of quality of maintenance, preventive maintenance completion, maintenance support, scheduling effectiveness, productivity, corrective maintenance backlog, and readiness of critical must-operate equipment.	95%/month	98%/month	96% in 2012	Steady performance of exceeding the minimum since 2000, most years meeting the target.
20	Air Emissions, Chemical Use and Selection, Energy Use, Natural Resource Preservation, Spills/Releases, Waste	Conduct a PdM program that will identify potential equipment failures.	90% weighted avg PdM index/mo	95% weighted avg PdM index/mo	100% in 2012	Completed scheduled PdM activities: above the target since 2003.

Table 5-17 FY 12 Objectives & Targets with Performance that Support EO 13423 & EO 13514

#	EO Goal	Aspect	Objective	Target	Performance	Success
1	Energy Efficiency and Scope 1 and 2 green house gas reduction	Air Emissions	Reduce Scope 1 and 2 green house gas emissions	Reduce by 28% by FY 2020 compared to a FY 2008 baseline	In FY 2012, 0.6 lbs of sulfur hexafluoride (SF6) was added to the BM power in-coming circuit breaker. This amount equates to a long-term slow loss of gas from tubing leaks on the circuit breaker. Tubing was tightened. The loss equates to 6.5 mt of CO2e. Additionally, 25.6 lbs of refrigerant R-22 and 12 lbs of R-404a were replenished at BM and BH, indicating that an equivalent amount had been lost to the atmosphere. This resulted in a Scope 1 CO2e equivalent of 17.7 mt for R-22 and 21.1 mt for R-404a. Total Scope 1 fugitive emissions in FY 2012 equaled 45.35 mt of CO2. There were no SF6 or refrigerant losses in 2008 (0 mt CO2e). Site process emissions (Scope 1) were 99.5% lower in FY 2012 (46.1mt) than in baseline FY 2008 (8,586.2 mt) because there were no degasification (degas) operations at SPR storage sites. Excluding the GHG from degas operations, tank GHG emissions were 20% lower in FY 2012 (46.1mt) than in baseline FY 2008 (57.7mt) due to high tank use (landing losses) in FY 2008. 274.1 mt of Scope 1 GHG were generated from non-fleet vehicles and other equipment. This is 20% less than generated in FY 2008 (344.2 mt). GHG generation is strictly based on mission. A total of 1.2 mt of GHG was emitted in FY 2012 in the on-site treatment of waste water. The slight increase over baseline FY 2008 (1.1 mt) was due to a slightly greater headcount (GHG calculations are based on headcount) in FY 2012. This is a	Objective not yet met. Electricity consumption (Scope 2 GHG) drives the success of this performance measure, and its consumption is driven by mission. There is a much greater chance of achieving the target during years when there are fewer fluid movements.

#	EO Goal	Aspect	Objective	Target	Performance	Success
					relatively very small GHG source on the SPR. Overall, energy consumption was greater in FY 2012 than in baseline FY 2008, and this resulted in a 55% higher Scope 2 GHG generation in FY 2012 (40,408.9 mt) than in FY 2008 (26,062.6 mt). The primary energy consuming activities in FY 2012 were an oil exchange (BC only), workover operations (all storage sites), and cavern leach (BH, BM, and WH). The dramatic increases at BH and WH were due to leach. Baseline energy use in FY 2008 at BM was much greater than the other sites due to degas operations; consequently, the FY 2012 consumption at BM was slightly less than that of the baseline. Less energy was consumed at BC in FY 2012 than in baseline 2008 due to the delivery of RIK (return in kind) crude oil activity at that site in FY 2008. Working conditions in the office environment at NO did not substantially change from the baseline year to FY2012; consequently the change in GHG generation was small. There was an overall 16.5% increase in Scope 1 and 2 GHG in FY 2012 (40,775.6 mt) over FY 2008 (34,994.3 mt). Note that this does not include Scope 1 GHG from the fleet vehicles.	
2	Energy Efficiency and Scope 1 and 2 green house gas reduction	Air Emissions	Provide on-site renewable energy generation	In FY 2012, renewable energy sources will supply 7.5% of the Department's (DOE) annual electricity consumption	An estimated 3.4 MWH/yr of electricity is generated by SPR solar panels to energize remote valve actuators and navigation lights. This is less than 0.0086% of energy consumed in FY 2012. However, renewable energy credits (REC's) equaling 7.5% of the energy consumed in FY 2011 (3,510 MWH) were purchased from a wind farm.	Goal not met yet, but REC's supplement this deficiency.
3	Scope 3 green house gas reduction	Air Emissions	Reduce Scope 3 green house gas	Reduce by 13% by FY 2020 based on a FY 2008 baseline.	Green house gas resulting from prime contractor air travel decreased 43% (122.4 mt) in FY 2012 over baseline year (214.1 mt). In FY 2012, commuting	Objective not yet met.

#	EO Goal	Aspect	Objective	Target	Performance	Success
					emissions from DOE and all prime contractors were 3,778 mt, an increase of 51% over the baseline (FY 2011).	
4	Energy Efficiency and Scope 1 and 2 green house gas reduction	Energy Use	Reduce energy intensity	Reduce by 30% by FY 2015 based on a FY 2003 baseline.	Energy consumption at the four storage sites in FY 2012 (68,213.7 MWH) increased by 69% compared to the FY 2003 baseline (40.355.4 MWH). Energy intensity in FY 2012 (964,723 Btu/GSF) increased by 67% compared to the 2003 baseline (576,658 Btu/GSF). The increase was due to mission-critical activities explained earlier under reducing Scope 1 and 2 GHG.	Objective not yet met.
5	Energy Efficiency and Scope 1 and 2 green house gas reduction	Air Emissions	Reduce Departmental fleet petroleum use and Increase use of alternative fuels. Acquire alternative fuel light duty vehicles.	Reduce petroleum use by 2% annually and by 30% by FY 2020, based on a FY 2005 baseline. Increase use of alternative fuels by 10% year over year. Strive to meet 75% acquisition of alternative fuel vehicles by FY 2015, if available.	SPR fleet fuel consumption in FY 2012 (105,982 gal) decreased by 16.2% over the FY 2005 baseline consumption (126,404 gal). No alternative fuels were used by SPR fleet vehicles in FY 2012, but 56% of the vehicles were E85 fuel compatible. An alternative fuel vehicle (AFV) waiver was submitted to DOE Headquarters due to the lack of an alternative fuel (LPG or E85 fuels) infrastructure for AFV's in the areas around SPR sites. In FY 2012 13 hybrid vehicles (eight sedans, one SUV, and four trucks) replaced equivalent conventional vehicles, and four vehicles were dropped from the fleet. There have been no purchases of alternative fuel vehicles.	Fuel reduction objective progressing with the incremental target for FY 2012 (-14%) surpassed. Progressing on the vehicle reduction and AFV acquisition targets.
6	Energy Efficiency and Scope 1 and 2 green house gas reduction Water use efficiency and management	Energy and Water Use	Install metering for electricity and water.	To the maximum extent practicable, install advanced metering for electricity and standard metering for water.	No additional advanced or standard metering installed in FY 2012, but electricity and water metering are being considered for buildings selected to be renovated to Guiding Principles specifications. Installation will be completed in FY 2013.	Objective progressing but not yet met.
7	Energy	Energy Use	Install cool roofs	Install cool roofs,	No cool roofs were installed in FY 2012. Cool roof	Objective will be met

#	EO Goal	Aspect	Objective	Target	Performance	Success
	Efficiency and Scope 1 and 2 green house gas reduction			unless uneconomical, for applicable building roof replacements.	requirements and applicability will be evaluated on all future roof replacements of existing buildings and new buildings.	when the appropriate application occurs.
8	Energy Efficiency and Scope 1 and 2 green house gas reduction Water use efficiency and management	Energy and Water Use	Train personnel to direct energy and water management programs.	Trained personnel will direct energy and water management programs and dedicate all or a substantial portion of their time to effective implementation of energy and water management plans. DOE facility energy managers are to be certified energy managers by 9/12.	The SPR has not yet identified a person to become a certified energy manager, although focal points have been identified for DOE and the M&O contractor. SPR staff will continue to enhance their current knowledge base by attending conferences and taking FEMP sponsored web-based training.	Objective not yet met.
9	Energy Efficiency and Scope 1 and 2 green house gas reduction	Air Emissions	Reduce or eliminate the use of sulfur hexafluoride (SF6).	Establish a sulfur hexafluoride (SF6) management program to control and reduce or eliminate SF6 fugitive emissions.	Key SF6 emission sources (totaling 225 lbs) have been identified and are being monitored and managed to prevent loss. In FY 2012, 0.6 lbs of SF6 was added to the BM power in-coming circuit breaker. This amount equates to a long-term slow loss of gas from tubing leaks on the circuit breaker. Tubing was tightened. The loss equates to 6.505 mt of CO2e. Monitoring and management of existing sources of SF6 will continue, and as equipment containing SF6 reaches the end of service, replacements will be sought that do not use SF6. In the meantime, maintenance contracts require its control, and procurement is monitored to control the amount purchased. SF6 is used in relatively small quantities on the SPR, and it is managed to prevent release.	Objective not yet met, but progressing.
10	High performance sustainable design	Project Design	Increase number of high performance sustainable buildings on the SPR	15% of enduring buildings larger than 5,000 gross sq ft (GSF) on the SPR must be	In FY 2012 no buildings complied with the Guiding Principles, but eight buildings were identified for upgrading to meet the 15% target by FY 2015. In 2011 the DOE A/E contractors conducted a gap	Objective not yet met, but progressing.

#	EO Goal	Aspect	Objective	Target	Performance	Success
				compliant with the five guiding principles of the High Performance Sustainable Building by 2015.	analysis to identify necessary projects required to bring these buildings into compliance, and a schedule and cost estimates were developed. A budget module for funding was created by DOE in FY 2012.	
11	Water use efficiency and management	Water Use	Reduce potable water use	Reduce potable water intensity by 16% by FY 2015 and 26% by FY 2020, based on a FY 2007 baseline.	Potable water consumed in FY 2012 was 29.7 million gallons, as compared to 10.4 million gallons consumed in FY 2007. This is a 185% increase in consumption. Potable water intensity in FY 2012 was 123.0 gal/GSF compared to 41.3 gal/GSF in FY 2007. This is a 198% increase in water intensity. The dramatic increase in FY 2012 was directly related to the level of mission/industrial activity. SPR conducted cavern-leach activities throughout most of FY 2012 at BH, BM, and WH, and a crude oil exchange at BC at the end of FY 2012. These fluid movements require considerable potable water use for pump bearing cooling and seal flush.	Objective not yet met, but progressing.
12	Water use efficiency and management	Water Use	Reduce industrial/landscaping/ agricultural water use	Reduce industrial/landscaping/ agricultural water consumption by 20% by FY 2020, based on an FY 2010 baseline.	The only significant source of ILA water (non-potable freshwater) on the SPR is from an on-site well at WH that is used to flush brine strings (brine piping that extends down into the caverns) and serves as fire water and seal flush water for pumps. During FY 2010, 5.12 million gallons were used. In FY 2012, 11.18 million gallons were used, a 118% increase. The greater water demand was due to the leach program at the site.	Objective not yet met.
13	Pollution prevention and waste elimination	Waste	Minimize waste generation and pollutants through source reduction	Refer to objectives 4 and 5-in Table 5-16.	Refer to objectives 4 and 5 in Table 5-16.	Targets achieved. Refer to objectives 4 and 5 in Table 5-16.
14	Pollution prevention and waste elimination	Waste	Divert non-hazardous solid waste (excluding construction/demolitio n debris) for recycling.	Divert at least 50% of non-hazardous solid waste (excluding construction/demolition debris) by the end of	Refer to related objective 6 in Table 5-16. In FY 2012, 4,254 mt of non-hazardous, non-construction solid waste was managed. Of this, 87.3% was recycled. The primary waste streams that were recycled included abrasives, exploration and	Target was achieved. To help minimize waste generation, waste determinations are generated and

#	EO Goal	Aspect	Objective	Target	Performance	Success
				FY 2015.	production wastes, cardboard, paper, used oil, and electronics. The primary waste streams that were disposed of as waste included municipal solid waste, some exploration and production wastes that could not be recycled, wash waters, firefighting foam contaminated dirt, wood pallets, and petroleum contaminated solids.	documented on each waste stream, including those that are destined for recycling. Effort continues to segregate re-useable materials from the SPR wastes.
15	Pollution prevention and waste elimination	Waste	Divert construction and demolition materials and debris for recycling.	Divert at least 50% of construction/demolition materials and debris by the end of FY 2015.	Refer to related objective 6 in Table 5-16. In FY 2012, 95.9 mt of construction/demolition materials and debris were managed. Of this, 87.5% was recycled and included primarily concrete and scrap metal. The remaining material was disposed of as wood scrap and undefined construction debris.	Target was achieved. The SPR is opportunistic, particularly with construction activities where bulk wastes such as scrap metal and concrete can be recycled. Construction contractors must submit waste management plans to the M&O contractor for approval prior to work. Wastes expected to be generated are evaluated to determine if they can be reduced and recycled prior to generation. Construction contractors are assisted in maximizing their recycling.
16	Pollution prevention and waste elimination Sustainable Acquisition	Waste Green Procurement	Reduce paper use and acquisition	Reduce printing paper use and acquisition of uncoated printing/writing paper containing at least 30% post-consumer fiber.	The SPR continues to use GSA for all printing paper purchases. All paper purchased by the SPR is 30% post-consumer, in accordance with the affirmative procurement specifications for writing papers.	Target was achieved. Printing paper consumption has declined. In FY 2000, 525 boxes of writing paper were used by the reproduction department at Headquarters. It has declined to 48 boxes in

#	EO Goal	Aspect	Objective	Target	Performance	Success
						FY 2012. Fewer hard copy documents are needed en masse, such as for hand-outs in meetings and presentations and for document libraries. The SPR has electronic content management systems for all documents; there are very few official hard copy documents remaining in use.
17	Pollution Prevention and waste elimination Sustainable Acquisition	Green Procurement	Meet procurement sustainability requirements and include sustainable acquisition clause.	At least 95% of acquisitions include sustainability clause, leadership goal target is >.75% of acquisitions. Strive for 60% for biobased products by the end of FY 2013.	The SPR met or exceeded the established leadership goals for 7 of the 17 priority product categories that were purchased by the SPR. Leadership goals were met or exceeded in the cleaners (99%), copy paper (100%), monitors (97%), servers (100%), furniture (99%), concrete (83%), and sorbents (100%) categories.	Targets achieved. Sustainability acquisition clauses are included in all procurement contract solicitations. Acquisition language and summaries of work include Federally-mandated products and service requirements.
18	Pollution Prevention and waste elimination Sustainable Acquisition	Green Procurement	Meet procurement sustainability requirements and include sustainable acquisition clause.	At least 95% of acquisitions include sustainability clause, leadership goal target is ≥.75% of acquisitions. Strive for 60% for biobased products by the end of FY 2013.	The SPR met or exceeded the established leadership goals for 7 of the 17 priority product categories that were purchased by the SPR. Leadership goals were met or exceeded in the cleaners (99%), copy paper (100%), monitors (97%), servers (100%), furniture (99%), concrete (83%), and sorbents (100%) categories.	Targets achieved. Sustainability acquisition clauses are included in all procurement contract solicitations. Acquisition language and summaries of work include Federally-mandated products and service requirements.
19	Pollution prevention and waste	Air Emissions Public Involvement	Reduce/minimize quantity of toxic/hazardous	Refer to objectives 7, 8, 9, and 10 in Table 5-16.	Refer to objectives 7, 8, 9, and 10 in Table 5-16. For many years the SPR has employed the QPL for selecting chemical products. The QPL is updated	Targets achieved. Control and minimization of toxic

#	EO Goal	Aspect	Objective	Target	Performance	Success
	elimination	Spill/Release Waste Natural Resource Preservation	chemicals and materials acquired, used, or disposed.		continuously with the addition of new greener and safer products and the deletion of previously approved products that are no longer as green or safe as newer equivalents.	chemicals have been audited at each site from FY 2009 through FY 2012, and will continue in FY 2013. Adherence with the QPL is part of this audit, with the expectation of 100% compliance. In 2011 four of five sites were 100% compliant. In FY 2012 four sites were compliant, and one was 98.6% compliant (2 products out of 144 evaluated were not on the QPL). Those not compliant over the past four years were not grossly out of compliance – usually less than three or four "rogue" chemical products were found, and these were in small, consumer-sized quantities. Process hazard analyses are performed on new activities and revalidated on previously reviewed activities on a routine basis. These analyses consider chemical hazards as well as physical ones.
20	Pollution prevention and waste	Waste	Divert compostable and organic material from the waste stream.	Increase diversion of compostable and organic material from	Currently the SPR does not compost with designated composting equipment. Cut grass from lawns around buildings is mulched in place by	Currently this goal has no significant impact on the SPR.

#	EO Goal	Aspect	Objective	Target	Performance	Success
	elimination			the waste stream.	mowers. At the reserve sites, cut grass in large open areas mowed with large tractors is also left in place. Except for on-site social events, food is not prepared (i.e. in a cafeteria) at the SPR, therefore there is no substantial amount of food scraps regularly available for composting.	
21	Pollution prevention and waste elimination	Air emissions Public Involvement Spill/Release Waste Natural Resource Preservation	Implement integrated pest management and other appropriate landscape management practices.	Reduce use of chemical pesticides in landscape management. No numerical target has been set.	Due to security requirements, vegetation is generally maintained at a low height throughout the sites. Vegetation is managed mechanically, primarily, and chemically where mowing is too difficult or unsafe. Only non-restricted herbicides are used. Applicators are aware of the mixing requirements set by the herbicide label so that chemical solutions are applied at the appropriate concentration for the target vegetation.	Herbicide application is minimized due to material and manpower costs. In accordance with the intent of the QPL, pesticides, like other chemical products, will be evaluated in the future for reduced toxicity.
22	Pollution prevention and waste elimination Sustainable Acquisition	Air emissions Public Involvement Spill/Release Waste Natural Resource Preservation	Use acceptable alternative chemicals and processes that support procurement policies.	Refer to objectives 7, 8, 9, and 10 in Table 5-16. Increase use of acceptable alternative chemicals and processes that support procurement policies.	Refer to objectives 7, 8, 9, and 10 in Table 5-16. The SPR M&O contractor continually seeks new chemical products, especially those that are greener than previously approved equivalents. Requests for new products come from M&O personnel and subcontractors. Only chemical products found on the SPR Qualified Products List (QPL) are allowed to be used. The QPL is a dynamic list that is becoming greener with age.	Targets achieved. Selection of chemical products purchased is controlled. All purchase requisitions (PRs) are generated electronically and go through a review process where the PR is automatically routed to different functions (i.e. environmental, safety) for review and approval before reaching the buyer. All credit card purchases are tracked with a completed form that prompts the requestor to verify that any chemical products purchased are on the QPL. No chemical products can be

#	EO Goal	Aspect	Objective	Target	Performance	Success
						purchased via check requests.
23	Scope 1 green house gas Pollution prevention and waste elimination Sustainable Acquisition	Air Emissions	Decrease use of chemicals that would jeopardize achieving green house gas emission reduction targets.	Refer to objectives 8, 9, and 10 in Table 5-16.	Refer to objectives 8, 9, and 10 in Table 5-16. Chemical such as refrigerants and SF6 have been identified by location and inventoried. In FY 2012, 0.6 lbs of SF6 was added to the BM power in-coming circuit breaker, and 25.6 lbs of refrigerant R-22 and 12 lbs of R-404a were replenished at BM and BH, indicating that an equivalent amount had been lost to the atmosphere. Effort continues to reduce/eliminate VOC emissions from crude oil through leak awareness, reducing exposure of VOCs to the atmosphere, and using permitted structures such as crude oil storage tanks with emissions controls.	Despite the chemical losses, the SPR has controls in place to reduce these chemicals. Selection and purchase of chemical products will continue to be monitored and controlled.
24	Data Centers and Electronic Stewardship	Energy Use	Meter all data centers to measure monthly power utilization effectiveness (PUE)	Meter 100% of data centers by FY 2015.	No meter has been installed to measure data center energy consumption.	Target not met, but power usage data is available from power distribution unit (PDU) for all computing equipment operating in the data center. It can not track energy used by lighting and air conditioning, however.
25	Data Centers and Electronic Stewardship	Energy Use	Data centers will be energy efficient.	Data centers will have a maximum annual weighted average PUE of 1.4 by FY 2015.	Current PUE is 1.8. A contracted HVAC specialist evaluated the data center cooling system for efficiency improvements and provided four alternatives for improvement. All involved replacing the 12-year-old refrigeration units with more efficient air or water cooled units. The alternatives differed based on the inclusion of LED lighting (replacing compact fluorescent lighting), data center reconfiguration to improve air flow, adding ceiling insulation, and reducing the footprint of the data center. Project costs would were estimated at $190K to $270K, depending on the alternative.	Performance is near target. The results of the evaluation were presented by the M&O contractor to DOE SPRPMO for consideration.

#	EO Goal	Aspect	Objective	Target	Performance	Success
26	Data Centers and Electronic Stewardship	Energy Use	PC's laptops, and monitors will be energy efficient.	100% of eligible PC's, laptops, and monitors will have power management features activated by FY 2012.	100% of virtual current desk top function is available to users. Energy efficient thin client devices are available to 48% of users. All printers are set to go into power saver mode when not in use. All monitors are set to go to sleep after being idle for 20 minutes.	Target achieved. Effort is being made to manage power on all eligible equipment.

5.10 Wildlife

The four SPR storage sites are located on the Central and Mississippi Flyways. The coastal position of BM, BH and WH in particular make them the last resting and feeding stop for migrating birds before they make the arduous trip across the Gulf of Mexico, to the wintering areas in central and South America; and the first stopover when they migrate back to North America in the spring. Without places along the way that provide an adequate food supply for the quick replenishment of fat reserves, shelter from predators, and water, these birds are probably not going survive.

In an effort to provide a resting place for migrating birds selected habitat areas at BH, BM and WH are not mowed from early fall through early spring to provide food and shelter and nesting for migrating and resident birds, and nest boxes and platforms are provided for waterfowl to raise their young. Purple Martin houses have been installed at WH and BH to attract mosquito eating Martins, and invasive vegetation has been removed and replaced with native materials. At BC food plots are planted in the buffer zones with clovers, grasses and cereals to provide food for wintering wildlife. These plots are actively used by deer, rabbit, and numerous species of birds. At all sites when ground nests, such as terns and Killdeer, are discovered they are flagged for the duration of the nesting season and equipment has been designated for limited/restricted use on occasion when they harbor bird nests.

Select SPR site personnel have received wildlife rescue training in order to relocate wildlife found on the site and trained in rehabilitation techniques such as oiled wildlife response which allows personnel to work under the supervision of a licensed rehabilitator or manage contract rehabilitators.

Besides the wildlife habitat areas, wildlife activities focus on educating personnel about the wildlife that can be found in their area. At BM, interpretive signage that identifies the waterfowl species most likely to be seen are installed around the ponds in the habitat areas. Throughout the year informative papers and posters highlighting specific wildlife topics are developed and sent to the sites for posting on their wildlife bulletin boards.

The sites also conduct periodic avian inventories per the Memorandum Of Understanding (MOU) between US Fish and Wildlife and DOE. The inventories are uploaded to the Cornell Ornithology Laboratory database and used to assess the health and movement of populations of migratory birds. The SPR has an active dialog with Cornell ornithologists regarding unusual observations, and dearth or abundance of species.

Both BH and BM have developed wildlife web pages within the site's website that contain photographs taken of the different bird species observed and counted, and other interesting wildlife information. BH has actively involved employees in their wildlife program by posting photographs taken by site personnel of wildlife seen at home or on site.

In recent years many raptors have experienced a decline in population due in large part to habitat destruction and more recently pesticide use in their wintering grounds. Mice and rats are the food source for raptors, and ingesting a prey that has eaten bait will result in secondary poisoning

to the raptor. In an effort to follow the MOU and avoid negative impacts on raptor populations the most harmful of rat poisons have been removed from the SPR QPL, and those rodenticides that have a less harmful impact will be approved.

End of Section

6 Quality Assurance

The SPR sites undergo periodic evaluation throughout the year in the form of annual internal audits as well as inspections by outside federal and state agencies. The structured laboratory quality assurance program has continued through the systematic application of acceptable accuracy and precision criteria at SPR laboratories. Compliance with this and other environmental program requirements was reviewed and evaluated at each site by means of DM's Organizational Assessments and program inspections at selected sites by state and federal environmental agencies. Results from the environmental program assessments are addressed in Section 2 of this report.

6.1 Field Quality Control

All field environmental monitoring and surveillance activities are performed in accordance with standard procedures, which are maintained in DM's Laboratory Programs and Procedures Manual, the EMP and in individual sampling and analytical work instructions. These procedures include maintenance of chain-of-custody, collection of quality control (QC) samples, and field documentation.

6.2 Data Management

SPR and contractor laboratories generate SPR data. All data generated by SPR laboratories are recorded and maintained in bound, numbered, and signed laboratory notebooks. Contractor laboratory data and accompanying QC data are received by the site laboratory or environmental department and retained on site as part of the original data file.

Water quality data are added to the SPR ES&H Data Management System for retention, manipulation, and interpretation. The data are compiled and appear in various reports such as this SER, in support of assessments of the SPR, evaluations of explained events, and development of appropriate responses.

6.3 Performance Evaluation Samples

The Louisiana and Texas environmental agencies have mandated that any commercial laboratory submitting environmental results from samples to the state must be accredited by the state. The SPR laboratories by definition are not "commercial" and as a result are not required to participate. However, the laboratories analyze Performance Evaluation (PE) samples twice per calendar year and these data are provided to the appropriate state agency. Through this program, the Louisiana and Texas environmental agencies ensure verifiable and consistent data generation by requiring the environmental analytical laboratories of permitted dischargers to perform analysis on blind samples for each of the permit parameters. The laboratories have successfully completed their 2012 round of blind samples. Resultant data were provided to the appropriate state agencies, via the PE sample contractor/provider on a standard report form. The results of this study indicate that all SPR laboratories performed acceptably and are approved for continued DMR analyses.

6.4 Laboratory Accuracy and Precision Program

The SPR laboratory quality assurance program is based on the U.S. EPA Handbook for Analytical Quality Control in Water and Wastewater Laboratories. This program focuses on the

use of solvent or standard and method blanks, check standards, and for instrumental methods, final calibration blanks and final calibration verification standards with each analytical batch to verify quality control. Additionally, replicate and spiked samples are analyzed at a 10 percent frequency to determine precision and accuracy, respectively.

Analytical methodology is based on the procedures listed in Table 6-1. Sufficient quality assurance analyses were performed in 2012 to verify the continuing high quality of SPR laboratory data.

6.5 Control of Subcontractor Laboratory Quality

The M&O Contractor subcontracts some of the required analytical work. The Laboratories Programs and Procedures Manual contains mandatory guidelines by which such contracts must be prepared. In addition, the respective laboratory staff and M&O Contractor Quality Assurance, Operations and Maintenance, and Environmental staff review laboratory procurement documents.

Subcontractor laboratory service vendors are selected from an approved vendor's list maintained by the M&O Contractor Quality Assurance organization. The successful bidder must be on the approved vendor's list prior to the start of the laboratory contract. Vendors on the approved list are periodically reassessed by the M&O Contractor Quality Assurance and Operations and Maintenance organizations for adequacy of their analytical and quality assurance program.

Table 6-1 SPR Wastewater Analytical Methodology

Parameter	Method	Source*	Description
Biochemical Oxygen Demand	5210(B) 405.1	APHA EPA-1	5 Day, 20 ^{o}C 5 Day, 20 ^{o}C
Chemical Oxygen Demand	D1252-88(B) 410.4 5220(D)	ASTM EPA-1 APHA	Micro Spectrophotometric Proc. Colorimetric, Manual Closed Reflux, Colorimetric
Fecal Coliform	Part III-C-2 9222(D)	EPA-2 APHA	Direct Membrane Filter Method Membrane Filter Procedure
Residual Chlorine	4500-C1(G) 330.5 8021	APHA EPA-1 Hach	DPD Colorimetric Spectrophotometric, DPD DPD Method
Oil & Grease (Total, Recoverable)	413.1	EPA-1	Gravimetric, Separatory Funnel Extraction
Oil & Grease (Partition, Gravimetric)	5520-(B)	APHA	Gravimetric, Separatory Funnel Extraction
Total Organic Carbon	415.1 D4839-88 5310(C) D2579(A) 5310(B)	EPA-1 ASTM APHA ASTM APHA	Combustion or Oxidation Persulfate – UV Oxidation, IR Persulfate – UV Oxidation, IR Combustion – IR Combustion - IR
Dissolved Oxygen	D888-87(D) 360.1 360.2 4500-O(C) 4500-O(G)	ASTM EPA-1 EPA-1 APHA APHA	Membrane Electrode Membrane Electrode Winkler Method with Azide Mod. Winkler Method with Azide Mod. Membrane Electrode

Parameter	Method	Source*	Description
Hydrogen Ion conc. (pH)	D1293-84(A&B) 150.1 4500-H^+(B)	ASTM EPA-1 APHA	Electrometric Electrometric Electrometric
Total Dissolved Solids (Residual, Filterable)	160.1 2540(C)	EPA-1 APHA	Gravimetric, Dried at 180^oC Gravimetric, Dried at 180^oC
Total Suspended Solids (Residual, Non-Filterable)	160.2 2540(D)	EPA-1 APHA	Gravimetric, Dried at 103-105^oC Gravimetric, Dried at 103-105^oC
Salinity	D4542-85 (Sect. 7) 2520(B) & 2510 210B	ASTM APHA APHA (16th Ed.)	Refractometric Electrical Conductivity Hydrometric
Biomonitoring	1006.0 1007.0	EPA-3 EPA-3	*Menidia beryllina* 7 day survival *Mysidopsis bahia* 7 day survival

EPA-1 = U.S. Environmental Protection Agency, Methods for Chemical Analysis of Water and Wastes, Document No. EPA - 600/4-79-020.

APHA = American Public Health Association, et al., Standard Methods for the Examination of Water and Wastewater.

EPA-2 = U.S. EPA, Microbiological Methods for Monitoring the Environment: Water and Wastes, Document No. EPA-600/8-78-017.

ASTM = American Society for Testing and Materials, Annual Book of Standards, Section 11 - Water, Volumes 11.01 and 11.02.

Hach = Hach Company, Hach Water Analysis Handbook.

EPA-3 = U.S. EPA, Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms, Document No. EPA/600/4-87/028.

End of Section

Appendix A1
Environmental Standards List

DESCRIPTION	STANDARD	AREA
National Environmental Policy Act Implementing Procedures	10 CFR 1021	MR
Compliance with Flood Plain/Wetlands Environmental Review	10 CFR 1022	MR
Occupational Radiation Protection - Applicable and Enforceable Portions	10 CFR 835	RP
Storage, treatment, and disposal of nondefense toxic and hazardous materials	10 USC 2692	HW
Boiler And Pressure Vessels - Degas Project Only	120 IAC	IS
(Aviation) Operating Requirements: Domestic, Flag, and Supplemental Operations	14 CFR 121	IS
(Aviation) Certifications and Operations	14 CFR 125	IS
(Aviation) Certification and Operations of Scheduled Air Carriers with Helicopters	14 CFR 127	IS
(Aviation) Rotorcraft External Load Operations	14 CFR 133	IS
(Aviation) Operating Requirements: Commuter and On-Demand Operations	14 CFR 135	IS
(Aviation) Agricultural Aircraft Operations	14 CFR 137	IS
(Aviation) Certification and Operation: Land Airport Serving Certain Air Carriers	14 CFR 139	IS
(Aviation) Repair Stations	14 CFR 145	IS
(Aviation) Objects Affecting Navigable Airspace	14 CFR 77	IS
(Aviation) Notification And Reporting - Accidents and Incidents	14 CFR 830	IS
(Aviation) General Operating and Flight Rules	14 CFR 91	IS
Oil and Gas Division	16 TAC 1.3	CW TS
Environmental Recycling	16 TAC 1.4	PP
Fish and Wildlife Coordination Act	16 U.S.C. §§ 661-666c	MR
Bald and Golden Eagle Protection Acts	16 U.S.C. §§ 668-668d	MR
Migratory Bird Treaty Act	16 U.S.C. §§ 703-711	MR
Endangered Species Act	16 USC Parts 1531-1544	MR
Radiation Control	25 TAC 1.289	IH IS RP
Commerce In Explosives (ATF)	27 CFR 55	IS, CS, FP
Imminent Danger	29 CFR 1903.13	IS
Posting of Notice: Availability of the Act, Regulations, and Applicable Standards	29 CFR 1903.2	IS
Recordkeeping and Reporting Occupational Injuries and Illnesses	29 CFR 1904	IS
General (1 through 8)	29 CFR 1910 SUBPART A	IS,FP
Adoption and Extension of Established Federal Standards (11 through 19)	29 CFR 1910 SUBPART B	IS
Walking-Working Surfaces (21 through 30)	29 CFR 1910 SUBPART D	IS
Means of Egress (35 through 38)	29 CFR 1910 SUBPART E	IS
Powered Platforms, Manlifts, and Vehicle Mounted Work Platforms (66 through 68)	29 CFR 1910 SUBPART F	IS
Occupational Health and Environmental Control (94 through 98)	29 CFR 1910 SUBPART G	IH
Hazardous Materials (101 through 126)	29 CFR 1910 SUBPART H	IS,CS,FP
Personal Protective Equipment (132 through 139)	29 CFR 1910 SUBPART I	IS
General Environmental Controls (141 through 147)	29 CFR 1910 SUBPART J	IS,FP
Medical and First Aid (151)	29 CFR 1910 SUBPART K	MS
Fire Protection (155 through 165)	29 CFR 1910 SUBPART L	IS,FP
Compressed Gas and Compressed Air Equipment (169)	29 CFR 1910 SUBPART M	IS
Materials Handling and Storage (176-179, 181, 183-184)	29 CFR 1910 SUBPART N	IS
Machinery and Machine Guarding (211 through 213, 215, 219)	29 CFR 1910 SUBPART O	IS
Hand/Portable Powered Tools and Other Hand-Held Equipment (241 through 244)	29 CFR 1910 SUBPART P	IS
Welding, Cutting, and Brazing (251 through 255)	29 CFR 1910 SUBPART Q	IS
Special Industries (269) Power generation, Transmission	29 CFR 1910 SUBPART R	IS
Special Industries (268) Telecommunications	29 CFR 1910 SUBPART R	IS
Electrical (301 through 306, 331–335, 399)	29 CFR 1910 SUBPART S	IS
Commercial Diving Operations (401 through 402, 410, 420-427, 430, 440-441)	29 CFR 1910 SUBPART T	IS
Toxic and Hazardous Substances (1000 through 1450 except 1029, 1043, 1045, 1047, 1050-1051)	29 CFR 1910 SUBPART Z	IH

DESCRIPTION	STANDARD	AREA
Designations for General Industry Standards Incorporated Into Body of Construction Standards	29 CFR 1926 APPENDIX A	IS
General (1 through 5)	29 CFR 1926 SUBPART A	MO
General Interpretations (10 through 16)	29 CFR 1926 SUBPART B	IS
General Safety and Health Provisions (20 through 35)	29 CFR 1926 SUBPART C	IS,FP
Occupational Health and Environmental Controls (50 through 66)	29 CFR 1926 SUBPART D	IS
Personal Protection and Life Saving Equipment (95 through 107)	29 CFR 1926 SUBPART E	IS,FP
Fire Protection and Prevention (150 through 159)	29 CFR 1926 SUBPART F	IS,FP
Signs, Signals, and Barricades (200 through 203)	29 CFR 1926 SUBPART G	IS
Materials Handling, Storage, Use, and Disposal (250 through 252)	29 CFR 1926 SUBPART H	IS
Tools - Hand and Power (300 through 307)	29 CFR 1926 SUBPART I	IS
Welding and Cutting (350 through 354)	29 CFR 1926 SUBPART J	IS
Electrical (400 through 408, 416-417, 431-432, 441, 449)	29 CFR 1926 SUBPART K	IS
Scaffolds (450 through 454)	29 CFR 1926 SUBPART L	IS
Fall Protection (500 through 503)	29 CFR 1926 SUBPART M	IS
Cranes, Derricks, Hoists, Elevators, and Conveyors (550 through 555)	29 CFR 1926 SUBPART N	IS
Motor Vehicles, Mechanized Equipment, and Marine Operations (600 through 606)	29 CFR 1926 SUBPART O	IS
Excavations (650 through 652)	29 CFR 1926 SUBPART P	IS
Concrete and Masonry Construction (700 through 706)	29 CFR 1926 SUBPART Q	IS
Steel Erection (750 through 752)	29 CFR 1926 SUBPART R	IS
Demolition (850 through 860)	29 CFR 1926 SUBPART T	IS
Blasting and the Use of Explosives (900 through 914)	29 CFR 1926 SUBPART U	IS
Power Transmission and Distribution (950 through 960)	29 CFR 1926 SUBPART V	IS
Rollover Protective Structures; Overhead Protection (1000 through 1003)	29 CFR 1926 SUBPART W	IS
Stairways and Ladders (1050 through 1060)	29 CFR 1926 SUBPART X	IS
Diving (1071 through 1092)	29 CFR 1926 SUBPART Y	IS
Toxic and Hazardous Substances (1100 through 1152 except 1129, 1145, 1147)	29 CFR 1926 SUBPART Z	IH
Hazardous Materials Information Development, Preparedness and Response Act	30 LA RS 2361-2379 SARA Title III	CS
General Provisions - Document Filing Procedures	30 TAC 1.1.10	CA
General Air Quality Rules	30 TAC 1.101	CA
Permits by Rule	30 TAC 1.106	CA
Control of Air Pollution from Visible Emissions and Particulate Matter	30 TAC 1.111	CA
Control of Air Pollution from Sulfur Compounds	30 TAC 1.112	CA
Control of Air Pollution from Hazardous Air Pollutants	30 TAC 1.113	CA
Control of Air Pollution from Motor Vehicles	30 TAC 1.114	CA
Control of Air Pollution from Volatile Organic Compounds	30 TAC 1.115	CA
Control of Air Pollution by Permits for New Construction or Modification	30 TAC 1.116	CA
Control of Air Pollution from Nitrogen Compounds	30 TAC 1.117	CA
Control of Air Pollution Episodes	30 TAC 1.118	CA
Federal Operating Permits Program	30 TAC 1.122	CA
Electronic Reporting	30 TAC 1.19.3	CA
Environmental Testing Laboratory Accreditation and Certification	30 TAC 1.25	CW MR
Water Quality Certification	30 TAC 1.279	CW
Applications Processing	30 TAC 1.281	CW
Public Drinking Water	30 TAC 1.290	CW
Water Rights, Procedural	30 TAC 1.295	CW
Water Rights, Substantive	30 TAC 1.297	CW
Occupational Licenses and Registrations	30 TAC 1.30	CW
Surface Water Quality Standards	30 TAC 1.307	CW

DESCRIPTION	STANDARD	AREA
Sludge Use, Disposal, and Transportation	30 TAC 1.312	HW
Used Oil	30 TAC 1.324	PP
Spill Prevention and Control	30 TAC 1.327	CW
Waste Minimization and Recycle	30 TAC 1.328	PP
Municipal Solid Waste	30 TAC 1.330	PP
Underground and Aboveground Storage Tanks	30 TAC 1.334	HW
Industrial Solid Waste and Municipal Hazardous Waste	30 TAC 1.335	HW
Radioactive Substance Rules	30 TAC 1.336	RP
Groundwater Protection Recommendation Letters and Fees	30 TAC 1.339	CW
Regulatory Flexibility	30 TAC 1.90	MR
MOU between TCEQ and RRC	30 TAC 7.117	CW, TS
Planning Division	31 TAC 1.15	CW
Oil Spill Prevention and Response	31 TAC 1.19	CW
Natural Resource Damage Assessment	31 TAC 1.20	CW
Oil Spill Prevention and Response Hearings Procedures	31 TAC 1.21	CW
Fisheries	31 TAC II.57	MR
Wildlife	31 TAC II.65	MR
Resource Protection	31 TAC II.69	MR
Coastal Management Program	31 TAC XVI.501	CW
Coastal Management Program Boundary	31 TAC XVI.503	CW
Coastal Management Program	31 TAC XVI.504	CW
Council Procedures for State Consistency With Coastal Management Program Goals and Policies	31 TAC XVI.505	CW
Council Procedures for Federal Consistency With Coastal Management Program Goals and Priorities	31 TAC XVI.506	CW
Certain vehicles must stop at all railroad grade crossings (Explosives)	32 LA RS 173.1	TS
Permission for operation; crossing railroad grade crossings; markings	32 LA RS 251 Subpart J.	TS
Equipment and inspection (Explosives)	32 LA RS 252	TS
Handling Class I (Explosive) Materials or Other Dangerous Cargo	33 CFR 126	CW
Control of Pollution by Oil and Hazardous Substances, Discharged Removed	33 CFR 153	CW
Facilities Transferring Oil or Hazardous Material in Bulk	33 CFR 154	CW
Oil and Hazardous Material Transfer Operations	33 CFR 156	CW
Reception Facilities for Oil, Noxious Liquid Substances, and Garbage (MARPOL)	33 CFR 158	HW
Permits for Structures or Work in or Affecting Navigable Waters of the U.S.	33 CFR 322	CW
Permits for Discharges of Dredged or Fill Material into Waters of the U.S.	33 CFR 323	CW
Process of Department of Army Permits	33 CFR 325	CW
Enforcement	33 CFR 326	CW
Definition of Waters of the United States	33 CFR 328	CW
Definition of Navigable Waters of the United States	33 CFR 329	CW
Nationwide Permits	33 CFR 330	CW
Compensatory Mitigation for Losses of Aquatic Resources	33 CFR 332	CW, MR
Markings of Structures, Sunken Vessels and Other Obstructions	33 CFR 64	CW
Private Aid to Navigation	33 CFR 66	CW
Aids to Navigation on Artificial Islands and Fixed Structures	33 CFR 67	CW
Risk Evaluation/Corrective Action Program	33 LAC I.13	MR
Groundwater Fees	33 LAC I.14	MR
Permit Review	33 LAC I.15	MR
Departmental Administrative Procedures	33 LAC I.3	MR
Notification Regulations and Procedures for Unauthorized Discharges	33 LAC I.39	MR

DESCRIPTION	STANDARD	AREA
Policy and Intent	33 LAC I.45	MR
Program Requirements	33 LAC I.47	MR
Organization and Personnel Requirements	33 LAC I.49	MR
On-site Inspection/Evaluation	33 LAC I.51	MR
Quality System Requirements	33 LAC I.53	MR
Sample Protocol/Sample Integrity	33 LAC I.55	MR
Maintenance of Accreditation	33 LAC I.57	MR
Emergency Response Regulations	33 LAC I.69	MR
General Provisions	33 LAC III.1	CA
Control of Emissions of Smoke	33 LAC III.11	CA
Emission Standards for Particulate Matter	33 LAC III.13	CA
Conformity	33 LAC III.14	CA
Rules and Regulations for the Fee System of the Air Quality Control Programs	33 LAC III.2	CA
Control of Emission of Organic Compounds	33 LAC III.21	CA
Odor Regulations	33 LAC III.29	CA
Standards of Performance for New Stationary Sources	33 LAC III.30	CA
Permit Procedures	33 LAC III.5	CA
Comprehensive Toxic Air Pollutant Emission Control Program	33 LAC III.51	CA
Area Sources of Toxic Air Pollutants	33 LAC III.53	CA
Prevention of Air Pollution Emergency Episodes	33 LAC III.56	CA
Chemical Accident Prevention and Minimization of Consequences	33 LAC III.59	CA
Ambient Air Quality	33 LAC III.7	CA
General Regulations on Control of Emissions and Emission Standards	33 LAC III.9	CA
General Provisions	33 LAC IX.1	CW
Surface Water Quality Standards	33 LAC IX.11	CW
Louisiana Water Pollution Control Fee System Regulation	33 LAC IX.13	CW
Water Quality Certification Procedures	33 LAC IX.15	CW
Rules Governing Disposal of Waste Oil, Oil Field Brine, and All Other Materials Resulting From the Drilling for, Production of, or Transportation of Oil, Gas or Sulphur (as amended January 27, 1953)	33 LAC IX.17	CW
State of Louisiana Stream Control Commission	33 LAC IX.19	CW
The LPDES Program Definitions and General Program Requirements	33 LAC IX.23	CW
Permit Application and Special LPDES Program Requirements	33 LAC IX.25	CW
LPDES Permit Conditions	33 LAC IX.27	CW
Transfer, Modification, Revocation and Reissuance, and Termination of LPDES Permits	33 LAC IX.29	CW
Permits	33 LAC IX.3	CW
General LPDES Program Requirements	33 LAC IX.31	CW
Specific Decision making Procedures Applicable to LPDES Permits	33 LAC IX.33	CW
Enforcement	33 LAC IX.5	CW
Effluent Standards	33 LAC IX.7	CW
Spill Prevention and Control	33 LAC IX.9	CW
General Provisions and Definitions	33 LAC V.1	HW
Definitions	33 LAC V.109	HW
Generators	33 LAC V.11	HW
Transporters	33 LAC V.13	HW
Treatment, Storage and Disposal Facilities	33 LAC V.15	HW
Containment Buildings	33 LAC V.18	HW
Tanks	33 LAC V.19	HW
Containers	33 LAC V.21	HW

DESCRIPTION	STANDARD	AREA
Prohibitions on Land Disposal	33 LAC V.22	HW
Corrective Action Management Units and Temporary Units	33 LAC V.26	HW
Transportation of Hazardous Liquids by Pipeline	33 LAC V.30	TS
Financial Requirements	33 LAC V.37	HW
Universal Wastes	33 LAC V.38	HW
Small Quantity Generators	33 LAC V.39	HW
Used Oil	33 LAC V.40	PP
Recyclable Materials	33 LAC V.41	PP
Lists of Hazardous Wastes	33 LAC V.49	HW
Fee Schedules	33 LAC V.51	HW
Manifest System for TSD Facilities	33 LAC V.9	HW
General Provisions and Definitions (solid waste regulations)	33 LAC VII.1	HW
Recycling and Waste Reduction Rules	33 LAC VII.103	PP
Waste Tires	33 LAC VII.105	PP
Scope and Mandatory Provisions of the Program	33 LAC VII.3	HW
Solid Waste Management System	33 LAC VII.5	HW
Solid Waste Standards	33 LAC VII.7	HW
Enforcement	33 LAC VII.9	HW
Program Applicability and Definitions	33 LAC XI.1	HW
Enforcement	33 LAC XI.15	HW
Registration Requirements, Standards and Fee Schedule	33 LAC XI.3	HW
Spill and Overfill Control	33 LAC XI.5	HW
Methods Release Detection and Release Reporting, Investigation, Confirmation and Response	33 LAC XI.7	HW
Out of Service UST Systems and Closure	33 LAC XI.9	HW
General Provisions	33 LAC XV.1	RP
Notices, Instructions, and Reports to Workers; Inspections	33 LAC XV.10	RP
Regulation and Licensing of Naturally Occurring Radioactive Material (NORM)	33 LAC XV.14	RP
Transportation of Radioactive Material	33 LAC XV.15	RP
Licensing and Radiation Safety Requirements for Irradiators	33 LAC XV.17	RP
Registration of Radiation Machines and Facilities	33 LAC XV.2	RP
Radiation Safety Requirements for Wireline Service Operations and Subsurface Tracer Studies	33 LAC XV.20	RP
Fee Schedule	33 LAC XV.25	RP
Licensing of Radioactive Material	33 LAC XV.3	RP
Standards for Protection Against Radiation	33 LAC XV.4	RP
Radiation Safety Requirements for Industrial Radiographic Operations	33 LAC XV.5	RP
Radiation Safety Requirements for Analytical X-Ray Equipment	33 LAC XV.8	RP
Advisory Council on Historical Preservation	36 CFR 800	MR
Pesticides	4 TAC I.7	CS
Asbestos	40 CFR 763	IH,CS
Criteria for State, Local, and Regional Oil Removal Contingency Plans	40 CFR 109	CW
Discharge of Oil	40 CFR 110	CW
Oil Pollution Prevention	40 CFR 112	CW
Designation of Hazardous Substances	40 CFR 116	CW
Determination of Reportable Quantities for Hazardous Substances	40 CFR 117	CW
State Certification of Activities Requiring a Federal License or Permit	40 CFR 121	CW
EPA Administrated Permit Programs: The National Pollutant Discharge Elimination System	40 CFR 122	CW

DESCRIPTION	STANDARD	AREA
Procedures for Decision Making	40 CFR 124	CW
Criteria and Standards for NPDES	40 CFR 125	CW
Toxic Pollutant Effluent Standards	40 CFR 129	CW
Water Quality Planning and Management, Water Quality Standards	40 CFR 131	CW
Secondary Treatment Regulation	40 CFR 133	CW
Guidelines Establishing Test Procedures for the Analysis of Pollutants	40 CFR 136	CW
National Primary Drinking Water Regulations	40 CFR 141	CW
National Primary Drinking Water Regulations Implementation	40 CFR 142	CW
National Secondary Drinking Water Regulations	40 CFR 143	CW
Underground Injection Control Program	40 CFR 144	CW
Underground Injection Control Program: Criteria and Standards	40 CFR 146	CW
State Underground Injection Control Programs	40 CFR 147	CW
Sole Source Aquifers	40 CFR 149	CW
NEPA Purpose, Policy and Mandate	40 CFR 1500	MR
NEPA and Agency Planning	40 CFR 1501	MR
NEPA Environmental Impact Statement	40 CFR 1502	MR
NEPA Commenting	40 CFR 1503	MR
NEPA Predecision Referrals to the Council of Proposed Federal Actions Determined to be Environmentally Unsatisfactory	40 CFR 1504	MR
NEPA and Agency Decision Making	40 CFR 1505	MR
Other Requirements of NEPA	40 CFR 1506	MR
NEPA Agency Compliance	40 CFR 1507	MR
NEPA Terminology and Index	40 CFR 1508	MR
Freedom of Information Act Procedures	40 CFR 1515	MR
Privacy Act Implementation	40 CFR 1516	MR
Pesticide Registration and Classification Procedures	40 CFR 152	CS
Labeling Requirements for Pesticides and Devices	40 CFR 156	CS
Worker Protection Standards (Pesticides)	40 CFR 170	CS
Certification of Pesticide Applicators	40 CFR 171	CS
General	40 CFR 220	CW
Section 404 (b) (1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material	40 CFR 230	CW, MR
Guidelines for Storage and Collection of Residential, Commercial, and Institutional Solid Wastes	40 CFR 243	HW
Comprehensive Procurement Guideline for Products Containing Recovered Materials	40 CFR 247	PP
Hazardous Waste Management System: General	40 CFR 260	HW
Identification and Listing of Hazardous Waste	40 CFR 261	HW
Standards Applicable to Generators of Hazardous Wastes	40 CFR 262	HW
Standards applicable to transporters of hazardous wastes	40 CFR 263	HW
Standards for Owners and Operators of Hazardous Waste, Treatment, Storage, and Disposal Facilities	40 CFR 264	HW
Standards for Management of Specific Hazardous Wastes	40 CFR 266	HW
Land Disposal Restrictions	40 CFR 268	HW
Requirements for Authorization of State Hazardous Waste Programs	40 CFR 271	HW
Approved State Hazardous Waste Management Programs	40 CFR 272	HW
Standard for Universal Waste Management	40 CFR 273	HW
Standards for Management of Used Oil	40 CFR 279	HW
Technical Standards and Corrective Action Requirements for Owners and Operators of UST	40 CFR 280	HW
Approved Underground Storage Tank Programs	40 CFR 282	HW

DESCRIPTION	STANDARD	AREA
National Oil and Hazardous Substances Pollution Contingency Plans	40 CFR 300	CS
Designation of Reportable Quantities and Notification	40 CFR 302	CS
Emergency Planning and Notification	40 CFR 355	CS
Hazardous Chemical Reporting: Community Right-to-Know	40 CFR 370	CS
Toxic Chemical Release Reporting: Community Right-to-Know	40 CFR 372	CS
Reporting Hazardous Substance Activity When Selling or Transferring Federal Real Property	40 CFR 373	CS
General Provisions	40 CFR 401	CW
General Pretreatment Regulations for Existing and New Sources of Pollution	40 CFR 403	CW
Approval & Promulgation of Implementation Plans	40 CFR 52	CA
Ambient Air Monitoring	40 CFR 53	CA
Standards of Performance for New Stationary Sources	40 CFR 60	CA
Determination of Emissions from Volatile Compounds Leaks	40 CFR 60, Appendix A, Method 21	CA
National Emission Standards for Hazardous Air Pollutants	40 CFR 61	CA
National Emission Standards for Hazardous Air Pollutant for Source Categories	40 CFR 63	CA
Assessment and Collection of Noncompliance Penalties	40 CFR 66	CA
State Operating Permit Programs	40 CFR 70	CA
General	40 CFR 700	CS
PCB Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions	40 CFR 761	CS
Regulations of Fuels and Fuel Additives	40 CFR 80	CA
EPA Regulations Designating Areas for Air Quality Planning	40 CFR 81	CA
Protection of Stratospheric Ozone	40 CFR 82	CA
Confiscation and disposal of explosives	40 LA RS 1472.11	IS
Unlawful storage of explosives	40 LA RS 1472.12	IS
Abandonment of explosives	40 LA RS 1472.13	IS
Careless use of explosives	40 LA RS 1472.18	IS
Reckless use of explosives	40 LA RS 1472.19	IS
License; manufacturer-distributor, dealer, user, or blaster of explosives	40 LA RS 1472.3	IS
Possession without license prohibited; exceptions (Explosives)	40 LA RS 1472.4	IS
Reports of losses or thefts; illegal use or illegal possession (Explosives)	40 LA RS 1472.7	IS
Energy Policy Act of 2005	42 USC 15801	MR, ABP, PP
Energy Conservation Reauthorization 1998	42 USC 6201 et seq.	MR, ABP, PP
Energy Policy and Conservation Act 1975 and 1994	42 USC 6291-6309	MR, ABP, PP
RCRA and Affirmative Procurement	42 USC 6962	MR, PP
National Environmental Policy	42 USC Chapter 55	MR
Air Pollution Prevention and Control	42 USC Chapter 85	CA
National Energy Policy Act of 1992	42 USC Chapter 91	MR, ABP, PP
Coastal Management	43 LAC I.7	CW
Water Resources Management	43 LAC VI	CW
Underwater Obstructions	43 LAC XI.3	TS
Pipeline Safety	43 LAC XI.5	TS
General Provisions (Statewide Order 29-B)	43 LAC XIX.1	CW
Pollution Control - Onsite Storage, Treatment and Disposal of Exploration and Production Waste (E&P Waste) Generated from the Drilling and Production of Oil and Gas Wells (Oilfield Pit Regulations)	43 LAC XIX.3	CW
Pollution Control (Class II Injection/Disposal Well Regulations)	43 LAC XIX.4	CW

DESCRIPTION	STANDARD	AREA
Fees	43 LAC XIX.7	CW
Reporting	43 LAC XIX.9	CW
Class I, III, IV, and V Injection Wells (Statewide Order 29-N-1)	43 LAC XVII.1	CW
Hydrocarbon Storage Wells in Salt Dome Cavities (Statewide Order 29-M)	43 LAC XVII.3	CW
Certification (Water and Wastewater Operator Certification)	48 LAC V.73	CW
Drinking Water Program	48 LAC V.77	CW
Oil Spill Prevention and Response Plans	49 CFR 130	CS
General Information, Regulations, and Definitions	49 CFR 171	TS
Hazardous Material Tables, Hazardous Materials Communications Requirements and Emergency Response Information Requirements	49 CFR 172	TS
Shippers - General Requirements for Shipments and Packaging	49 CFR 173	TS
Carriage by Public Highway	49 CFR 177	TS
DOT Response Plans for Onshore Pipelines	49 CFR 194	TS
Transportation of Hazardous Liquids by Pipeline	49 CFR 195	TS
Drug and Alcohol Testing	49 CFR 199	TS
Commercial Driver's License Standards; Requirements and Penalties	49 CFR 383	TS
Endangered and Threatened Wildlife and Plants and Migratory Bird Permits	50 CFR 10, 13, 17, 21, 22	MR
General Provisions	50 CFR 450	MR
Disposal of Birds or Quadrupeds Becoming a Nuisance	56 LA RS 112	MR
US Department of Agriculture Federal Biobased Products Preferred Procurement Program	7 CFR 3201-3202	MR, PP, ABP
Pesticide	7 LAC XXIII	CS
Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)	7 USC 136	CS
Farm Security and Rural Investment Act (FSRIA) of 2002, Section 9002	7 USC 8102	MR, ABP, PP
Control of Nuisance Wild Quadrupeds	76 LAC V.1.25	MR
Nuisance Wildlife Control Operator Program	76 LAC V.1.27	MR
Stennis Warehouse Spill Prevention, Control, and Countermeasures Plan	AAA 4010.10	CW
Property Management Manual	AAA 7003.7	PP
Threshold Limit Values For Chemical Substances - Current Year & Applicable Substances	ACGIH TLV	IH
Area Contingency Plan for Lake Charles	ACP USCG	CW
Area Contingency Plan for Port Arthur	ACP USCG	CW
Area Contingency Plan for New Orleans	ACP USCG	CW
Area Contingency Plan for Galveston	ACP USCG	CW
Area Contingency Plan for EPA Region 6	ACP-EPA	CW
Hazardous Materials Management Education Program Observations and Recommendations: Environmental Mgmt, Hazardous Waste Minimization, and Pollution Prevention for the SPR Operations	AIHMM	PP
Drill and Exercise Program Plan	AL 5500.11	MO,MR
Standard Methods for the Examination of Water and Wastewater	American Public Health Assoc.	CW
OSHA Referenced Standards	ANSI Standards	IS
Environmental Management Systems Specification With Guidance For Use	ANSI/ISO 14001:2004	MR
Compilation of Air Pollutant Emission Factors	AP-42	CA
Permit Regulations for the Construction and/or Operation of Air Emissions Equipment (Mississippi)	APC-S-2	CA
Amer. Petroleum Institute - Recommended Practices and Guides	API	MR
API Standard 653 for Tank Inspection, Repair, Alteration, and Reconstruction	API - Standard	CA
Environmental Effects of Army Actions	AR 200-2	MR

DESCRIPTION	STANDARD	AREA
Conduct of Training for the SPR M&O Contractor	ASI 3400.1	MO, MR
Integrated Logistics Support Procedures	ASI 4000.10	FP
SPR Plant Maintenance System	ASI 4330.16	FP,IS
Environmental Instructions Manual	ASI 5400.15	MR
Conduct of Operations at the SPR	ASI 5480.19	MO,MR
Accident Prevention Manual	ASI 5480.22	IS
Quality Assurance Instructions	ASI 5700.15	MR
Design Review Procedure	ASI 6430.15	MO,MR
Configuration Management Plan and Procedures	ASL 4700.1	MO,MR
SPR Environmental Monitoring Plan	ASL 5400.57	CW, CA
Fire Protection Manual	ASL 5480.18	FP
Emergency Readiness Assurance Plan	ASL 5500.10	MO,MR
Emergency Response Team Organization and Training Plan	ASL 5500.25	MO,MR
Emergency Management Plan and Implementing Procedures	ASL 5500.58	EM, FP
Drawdown Management Plan	ASL 6400.18	MO,MR
Cavern Inventory & Integrity Control Plan	ASL 6400.30	CW
Drawdown Readiness Program Plan	ASL 7000.397	MO,MR
OSHA Referenced Standards	ASME Standards	IS
Environmental Policy	ASP 5400.2	MR
SPR Crosstalk Information Exchange Program	ASR 7000.2	MO,MR
Readiness Review Board	ASR 7000.7	MO,MR
Membership in BRAMA	BC BRAMA	EM
Membership in Greater Baton Rouge Industry Alliance	BC Greater BR Industry Alliance	EM
Membership in Iberville CAER	BC Iberville CAER	EM
Membership in the Iberville LEPC	BC Iberville LEPC	EM
Membership in West Baton Rouge LEPC	BC West Baton Rouge LEPC	EM
Bayou Choctaw Emergency Response Procedures	BCI 5500.3	EM, FP
Bayou Choctaw Spill Prevention, Control, and Countermeasures Plan	BCL 5400.16	CW
Safety Agreement with NEWPARK	BH & NEWPARK	EM
Membership in the LEPC	BH LEPC	EM
Membership in the Local Law Enforcement Agency for BH	BH LLEA	EM
Membership in Sabine-Neches Chiefs Mutual Aid	BH Sabine-Neches Chiefs Mutual Aid	EM
Big Hill Emergency Response Procedures	BHI 5500.4	EM, FP
Big Hill Spill Prevention, Control, and Countermeasures Plan	BHL 5400.21	CW
Membership in the BMAT for BM	BM BMAT	EM
Membership in the Brazosport CAER	BM CAER	EM
Membership in the LEPC	BM LEPC	EM
Membership in the Local Law Enforcement Agency at BM	BM LLEA	EM
Agreement between BM and VDD on restrictions to working on Hurricane Levees near BM	BM VDD	EM
Bryan Mound Emergency Response Procedures	BMI 5500.5	EM, FP
Bryan Mound Spill Prevention, Control, and Countermeasures Plan	BML 5400.17	CW
Seminar on Site Characterization for Subsurface Remediations	CERI-89-224	CW
Fire Prevention and Protection; Emergency Services and Communication (Explosives)	Chapter 13 Jefferson Parish Code of Ordinances	FP

DESCRIPTION	STANDARD	AREA
County Regulation of Matters Relating to Explosives and Weapons Subchapter A. Explosives	Chapter 235 TX Statutes, Local Government, Title 7	IS
Operation and Movement of Vehicles (Explosives)	Chapter 545 TX Statutes, Transportation, Title 7	TS
Vehicle Equipment (Explosives)	Chapter 547 TX Statutes, Transportation, Title 7	TS
Hoisting And Rigging Handbook	DOE HDBK, 1090-9	IS
DOE Waste Minimization reporting Requirements, Nov. 1994	DOE Guideline	PP
Waste Minimization Reporting System (Wmin) User's Guide	DOE Handbook	PP
Pollution Prevention Handbook	DOE Handbook	PP
Guidance for the Preparation of the Waste Minimization and Pollution Prevention Awareness Plan, Dec 1993	DOE Handbook	PP
EPA's Interim Final Guidance to Hazardous Waste Generators on the Elements of a Waste Minimization Program	DOE Memorandum	PP
For all applicable DOE Orders See Contract No. DE-AC96-03PO92207 Applicable Standards List	DOE Orders	MO,MR
Pollution Prevention Program Plan	DOE S-0118	PP
Paint Repair of Exterior Metal Surfaces	DOE Standard Spec. 17900	PP
Management of Polychlorinated Biphenyls (PCBs)	DOE/EH-0350	CS, HW
Performance Objectives and Criteria for Conducting DOE Environmental Audits	DOE/EH-0358	MR
Annual report on Waste Generation and Waste Minimization Progress	DOE/EM-0276	PP
Standard for Fire Protection of DOE Electronic Computer/Data Processing Systems	DOE/EP-0108	FP
Waste Minimization/Pollution Prevention Crosscut Plan 1994	DOE/FM-0145	PP
Fire Protection for Relocatable Structures	DOE-STD-1088-95	FP
All SPR Environmental Permits as listed in the Annual Site Environmental Report (ASER)	Environmental Permits	CW, MR, AR
Protection and Enhancement of Environmental Quality	EO 11514	MR
Floodplain Management	EO 11988	CW
Protection of Wetlands	EO 11990	CW
Federal Compliance with Pollution Control Requirements	EO 12088	MR
Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations	EO 12898	MR
Marine Protected Area	EO 13158	CW
Responsibilities of Federal Agencies to Protect Migratory Birds	EO 13186	MR
Energy Efficient Standby Power Devices	EO 13221	PP
Preserve America	EO 13287	MR
Strengthening Federal Environmental, Energy, and Transportation Management	EO 13423	MR, EO, ABP, PP
Federal Leadership in Environmental, Energy, and Economic Performance	EO 13514	MR, PP
Protocol for Equipment Leak Emission Estimates, Jun 1993	EPA 453/R-93-026	CA
Practical Guide for Groundwater Sampling	EPA 600/2-85/105	CW
Handbook for Analytical Quality Control in Water and Wastewater Laboratories	EPA 600/4-79-019	CW
Methods for Chemical Analysis of Water and Wastes	EPA 600/4-79-020	CW
Handbook for Sampling and Sample Preservation of Water and Wastewater	EPA 600/4-82-029	CW
Addendum to Handbook for Sampling and Sample Preservation, EPA 600/4-82-029	EPA 600/4-83-039	CW
Microbiological Methods for Monitoring the Environment, Water and Wastes	EPA 600/8-78-017	CW
Facility Pollution Prevention Guide	EPA 600/R-92/088	PP

DESCRIPTION	STANDARD	AREA
Short Term Methods for Measuring the Acute Toxicity of Effluents to Aquatic Organisms	EPA 821-R-02-014	CW
Water Measurement Manual	EPA 832B81102	CW
Storm Water Management for Industrial Activities	EPA 833-R-92-002	PP
Engineering Support Branch Standard Operating Procedures and Quality Assurance Manual, 4/1/86	EPA Region IV	MR
Current National Water Quality Criteria	EPA Web Site	CW
EPA Waste Minimization Opportunity Assessment Manual	EPA, ISBN:0-86587-752-1	PP
Specification for 8' and 12' Unlighted and Externally Lighted Wind Cone Assembly	FAA AC 150/5345-27	IS
Heliport Design, January 4, 1988	FAA AC 150/5390-2	IS
Obstruction Marking and Lighting, October 1985	FAA AC 70/7460-1G	IS
For all applicable FAR and DEAR Clauses see Contract DE-AC96-03PO92207, Applicable Clauses List	FAR and DEAR Clauses	MR, PP, CA, CW, HW, CS
Factory Mutual - Approval Guide and Loss Prevention Data Sheets	FM	FP
Hazardous Waste Management Regulations (Mississippi)	HW-1	HW
Oil Cos. International. Marine Forum - International Oil Tanker and Terminal Safety Guide	ICIMF	IS
OSHA Referenced Standards	IEEE Standards	IS
STRATEGIC PETROLEUM RESERVE MANAGEMENT AND OPERATING AND CONSTUCTION MANAGEMENT SERVICES CONTRACTORS- ENVIRONMENTAL	IWA: DOE-DM-AGSC	CA, CS, CW, EM, FP, HW, MR, PP
STRATEGIC PETROLEUM RESERVE MANAGEMENT AND OPERATING AND CONSTUCTION MANAGEMENT SERVICES CONTRACTORS- SAFETY AND HEALTH	IWA: DOE-DM-AGSC	EM, FP, IH, IS, RP, TS
Pollution Prevention Assessment Manual for Texas Businesses	LP 92-03	PP
Surface Water and Ground Water Use and Protection (Mississippi)	LW-2	CW
Regarding Implementation of the Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds"	MOU- USFWS	MR
MOU with ATFE for Louisiana Sites during Emergencies	MOU with ATFE in LA	EM
MOU with ATFE for the Texas Sites during Emergencies	MOU with ATFE TX	EM
MOU with the BCSO for BM during Emergencies	MOU with BCSO	EM
MOU with Cameron Parish Sheriff's Office for WH during Emergencies	MOU with CamPSO	EM
MOU with Calcasieu Parish Sheriff's Office for WH during Emergencies	MOU with CPSO	EM
MOU with Entergy	MOU with Entergy	EM
MOU with the FBI for Louisiana Sites during Emergencies	MOU with FBI in LA	EM
MOU with the FBI for the Texas Sites during Emergencies	MOU with FBI TX	EM
MOU with Ft. Polk for Louisiana Sites during Emergencies	MOU with Ft. Polk	EM
MOU with JCSO for BH during Emergencies	MOU with JCSO	EM
MOU with LA Homeland Security for Louisiana Sites during Emergencies	MOU with LA Homeland Security	EM
MOU with LA State Police for Louisiana Sites during Emergencies	MOU with LA State Police	EM
MOU with US Army 797th Explosive Ordinance Co. for the Texas Sites during Emergencies	MOU with US Army 797 EOC	EM
SPR Gas and Geothermal Heat Effects on Crude Oil Vapor Pressure, Dec. 1994	MP 94W0000131	CA
Power to capture or destroy animals injurious to property	MSC Section 49-1-39	MR
Nuisance Wildlife	MSC Section 49-7-1	MR
Laboratory Programs & Procedures	MSL 7000.133	CW, HW
National Association of Corrosion Engineers	NACE	FP, IS
National Electric Safety Code	NEC	FP, IS
Fire Protection Handbook	NFPA	FP

DESCRIPTION	STANDARD	AREA
Uniform Fire Code	NFPA 1	FP
Standard for Portable Fire Extinguishers	NFPA 10	FP
Standard for Fire Service Professional Qualifications Accreditation and Certification Systems	NFPA 1000	FP
Life Safety Code®	NFPA 101	FP, IS
Guide on Alternative Approaches to Life Safety	NFPA 101A	FP
Standard for Fire Officer Professional Qualifications	NFPA 1021	FP
Standard for Professional Qualifications for Fire Inspector and Plan Examiner	NFPA 1031	FP
Standard for Professional Qualifications for Fire Investigator	NFPA 1033	FP
Standard for Fire Service Instructor Professional Qualifications	NFPA 1041	FP
Standard for the Installation of Smoke Door Assemblies and other Opening Protectives	NFPA 105	FP
Standard for Industrial Fire Brigade Member Professional Qualifications	NFPA 1081	FP
Standard for Low-, Medium-, and High-Expansion Foam	NFPA 11	FP
Standard for Emergency and Standby Power Systems	NFPA 110	FP
Standard on Stored Electrical Energy Emergency and Standby Power Systems	NFPA 111	FP
Standard for the Installation of Sprinkler Systems	NFPA 13	FP
Recommended Practice for Fire Department Operations in Properties Protected by Sprinkler and Standpipe Systems	NFPA 13E	FP
Standard for the Installation of Standpipe and Hose Systems	NFPA 14	FP
Recommended Practice for Fire Service Training Reports and Records	NFPA 1401	FP
Standard for Fire Service Respiratory Protection Training	NFPA 1404	FP
Standard on Training for Initial Emergency Scene Operations	NFPA 1410	FP
Standard for Water Spray Fixed Systems for Fire Protection	NFPA 15	FP
Standard on Fire Department Occupational Safety and Health Program	NFPA 1500	FP
Standard on Emergency Services Incident Management System	NFPA 1561	FP
Standard on Fire Department Infection Control Program	NFPA 1581	FP
Standard on Comprehensive Occupational Medical Program for Fire Departments	NFPA 1582	FP
Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems	NFPA 16	FP
Standard on Disaster/Emergency Management and Business Continuity Programs	NFPA 1600	FP
Standard for Dry Chemical Extinguishing Systems	NFPA 17	FP
Standard for Fire Safety Symbols and Emergency Symbols	NFPA 170	FP
Standard for Automotive Fire Apparatus	NFPA 1901	FP
Standard for the Inspection, Maintenance, Testing & retirement of in Service Automotive Fire Apparatus	NFPA 1911	FP
Standard on Fire Hose	NFPA 1961	FP
Standard for the Inspection, Care and Use of Fire Hose, Couplings and Nozzles; and the Service Testing of Fire Hose	NFPA 1962	FP
Standard for Fire Hose Connections	NFPA 1963	FP
Standard for Spray Nozzles	NFPA 1964	FP
Standard for Fire Hose Appliances	NFPA 1965	FP
Standard on Protective Ensemble For Structural Fire Fighting and Proximity Fire Fighting	NFPA 1971	FP
Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Fire and Emergency Services	NFPA 1981	FP
Standard on Personal Alert Safety Systems	NFPA 1982	FP
Standard on Fire Service Life Safety Rope and Equipment for Emergency Service	NFPA 1983	FP
Standard on Vapor-Protective Ensembles for Hazardous Materials Emergencies	NFPA 1991	FP
Standard on Liquid Splash-Protective Ensembles and Clothing for Hazardous Materials Emergencies	NFPA 1992	FP
Standard on Protective Clothing for Emergency Medical Operations	NFPA 1999	FP

DESCRIPTION	STANDARD	AREA
Standard for the Installation of Stationary Pumps for Fire Protection	NFPA 20	FP
Standard on Clean Agent Fire Extinguishing Systems	NFPA 2001	FP
Standard on Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire	NFPA 2012	FP
Standard for Smoke and Heat Venting	NFPA 204	FP
Standard on Selection, Care, Use, and Maintenance of Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire	NFPA 2113	FP
Standard for Water Tanks for Private Fire Protection	NFPA 22	FP
Standard on Types of Building Construction	NFPA 220	FP
Standard for High Challenge Fire Walls, Fire Walls, & Fire Barrier Walls	NFPA 221	FP
Standard for the Protection of Records	NFPA 232	FP
Standard for the Installation of Private Fire Service Mains and Their Appurtenances	NFPA 24	FP
Standard for Safeguarding Construction, Alteration, and Demolition Operations	NFPA 241	FP
Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems	NFPA 25	FP
Standard Methods of Tests of Fire Resistance of Building Construction and Materials	NFPA 251	FP
Standard Methods of Fire Tests of Door Assemblies	NFPA 252	FP
Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source	NFPA 253	FP
Standard Method of Test of Surface Burning Characteristics of Building Materials	NFPA 255	FP
Recommended Practice for Fire Flow Testing and Marking of Hydrants	NFPA 291	FP
Flammable and Combustible Liquids Code	NFPA 30	FP
Fire Protection Standard for Pleasure and Commercial Motor Craft	NFPA 302	FP
Standard for the Control of Gas Hazards on Vessels	NFPA 306	FP
Standard for the Construction and Fire Protection of Marine Terminals, Piers, and Wharves	NFPA 307	FP
Standard for the Safeguarding of Tanks and Containers for Entry, Cleaning, or Repair	NFPA 326	FP
Recommended Practice for Handling Releases of Flammable and Combustible Liquids and Gases	NFPA 329	FP
Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines	NFPA 37	FP
Standard for Tank Vehicles for Flammable and Combustible Liquids	NFPA 385	FP
Standard for Heliports	NFPA 418	FP
Code for the Storage of Liquid and Solid Oxidizers	NFPA 430	FP
Standard on Fire Protection for Laboratories Using Chemicals	NFPA 45	FP
Standard for Professional Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents	NFPA 472	FP
Standard for Competencies for EMS Personnel Responding to Hazardous Materials/WMD Incidents	NFPA 473	FP
Explosive Materials Code	NFPA 495	FP
Recommended Practice for the Classification of Flammable Liquids, Gases, or Vapors and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas	NFPA 497	FP
Building Construction and Safety Code	NFPA 5000	FP
Fire Safety Standard for Powered Industrial Trucks Including Type Designations, Areas of Use, Conversions, Maintenance, and Operation	NFPA 505	FP
Standard for Fire Prevention During Welding, Cutting, and Other Hot Work	NFPA 51B	FP
National Fuel Gas Code	NFPA 54	FP
Compressed Gases and Cryogenic Fluids Code	NFPA 55	FP
Guide to the Fire Safety Concepts Tree	NFPA 550	FP
Liquefied Petroleum Gas Code	NFPA 58	FP

DESCRIPTION	STANDARD	AREA
Standard on Industrial Fire Brigades	NFPA 600	FP
Standard for Security Services in Fire Loss Prevention	NFPA 601	FP
National Electrical Code	NFPA 70	FP, IS
Standard for Fire Retardant Treated Wood and Fire Retardant Coatings for Building Materials	NFPA 703	FP
Standard System for the Identification of the Hazards of Materials for Emergency Response	NFPA 704	FP
Recommended Practice for Electrical Equipment Maintenance	NFPA 70B	FP
Standard for Electrical Safety in the Workplace	NFPA 70E	FP
National Fire Alarm and Signaling Code	NFPA 72	FP
Standard for the Protection of Information Technology Equipment	NFPA 75	FP
Standard on Water Mist Fire Protection Systems	NFPA 750	FP
Recommended Practice on Static Electricity	NFPA 77	FP
Standard for the Installation of Lightning Protection Systems	NFPA 780	FP
Electrical Standard for Industrial Machinery	NFPA 79	FP
Standard for Fire Doors and other Opening Protectives	NFPA 80	FP
Recommended Practice for Protection of Buildings from Exterior Fire Exposures	NFPA 80A	FP
Standard for Fire Protection in Wastewater Treatment and Collection Facilities	NFPA 820	FP
Standard Classifications for Incident Reporting and Fire Protection Data	NFPA 901	FP
Standard for the Installation of Air-Conditioning and Ventilating Systems	NFPA 90A	FP
Standard for the Installation of Warm Air Heating and Air-Conditioning Systems	NFPA 90B	FP
Guide for Fire and Explosion Investigations	NFPA 921	FP
Standard for Smoke-Control Systems Utilizing Barriers & Pressure Differences	NFPA 92A	FP
SPR Qualified Products List	No number	PP,HW, CS
DM/AGT cooling water discharge agreement	No Number	CW
Construction of Geotechnical Boreholes and Groundwater Monitoring Systems Handbook (LDOTD and LDEQ)	No number	CW
DM, DOE, and AGSC Standard Environmental Contract Boilerplate	No Number	MO
Environmental, Safety, and Health Management Plan (FY 1998 - FY 2002)	No number	MO,MR
SPRPMO Level III Design Criteria	No number	MO, MR
Earth Manual, 3rd Ed., U.S. Department of the Interior, Bureau of Reclamation	No number	CW
Louisiana's Suggested Chemical Weed Control Guide for 1994 (LA Cooperative Extension Services)	No number	CW
The Sterling Brine Handbook (Int'l Salt Co.)	No number	CW
Membership in Clean Texas Program http://www.cleantexas.org/index.cfm	No number	MR
Technical Guidance Package for Chemical Sources, Storage Tanks, TCEQ, Feb 2001	No number	CA
Membership in Louisiana Environmental Leadership Program (LaELP) http://www.deq.state.la.us/assistance/elp	No number	MR
Organizational and Management Assessments	NOI 1000.72	MR
Pipkin Ranch Road use restrictions in emergencies	Pipkin Ranch Road	EM
Mississippi DWFP Nuisance Animals	Public Notice LE-3799 and LEI 3799	MR
Louisiana Department of Environmental Quality Risk Evaluation/Corrective Action Program	RECAP (2003)	CW
Pollution Prevention Assessment Manual	RG-133	PP
Summary of Work	S# 01010	MR
Demolition of Facilities	S# 02050	MR
Excavation, Backfilling, & Compaction	S# 02222	MR
Dikes & Embankments	S# 02223	MR
Roadways (Texas)	S# 02230	MR
Roadways (Louisiana)	S# 02233	MR

DESCRIPTION	STANDARD	AREA
Drilled and Belled Concrete Piers	S# 02362	MR
Piles and Pile Driving	S# 02364	MR
Steel Sheet Piling	S# 02369	MR
Fences & Gates	S# 02444	MR
Sensor - Compatible Fences and Gates	S# 02445	MR
Signage	S# 02450	MR
Seeding	S# 02485	MR
Asphaltic Concrete Pavement	S# 02513	MR
Asphaltic Concrete Pavement (Louisiana)	S# 02514	MR
Cast-In-Place Concrete	S# 03300	MR
Shotcrete	S# 03361	MR
Grout	S# 03600	MR
Brick Masonry	S# 04210	MR
Concrete Unit Masonry	S# 04220	MR
Structural Steel green	S# 05120	MR
Metal Roof Deck	S# 05310	MR
Rough Carpentry	S# 06100	MR
Finish Carpentry	S# 06200	MR
Vinyl Sheet Piles	S# 06521	MR
Rigid Insulation	S# 07212	MR
Built-Up Bituminous Roofing	S# 07510	MR
Aluminum Clad Flashing Membrane	S# 07550	MR
Fluid Applied Roofing	S# 07560	MR
Sealants & Caulking	S# 07920	MR
Metal Doors & Frames	S# 08100	MR
Flush Wood Doors	S# 08211	MR
Hurricane Windows	S# 08520	MR
Glass & Glazing	S# 08800	MR
Gypsum Wallboard	S# 09250	MR
Ceramic Tile	S# 09310	MR
Resilient Rubber Flooring	S# 09650	MR
Resilient Tile Flooring	S# 09660	MR
Carpet - Glue Down	S# 09688	MR
Epoxy Flooring	S# 09722	MR
Interior Painting	S# 09900	MR
Painting (Buildings)	S# 09901	MR
Metal Toilet Partitions	S# 10162	MR
Toilet Room Accessories	S# 10800	MR
Prefabricated Industrial/Commercial Metal Building	S# 13121	MR
Modular Insulated Building	S# 13126	MR
Prefabricated Metal Shelter/Housing	S# 13127	MR
Prefabricated Fiberglass Shelter/Housing	S# 13128	MR
Duct Insulation	S# 15258	MR
Plumbing Systems	S# 15400	MR
Plumbing Fixtures & Trim	S# 15450	MR
Air Cooled Condensing Unit	S# 15695	MR
Packaged Terminal Air Conditioners	S# 15731	MR
Conduit	S# 16111	MR
Lighting	S# 16510	MR

DESCRIPTION	STANDARD	AREA
DOE Policy on Signatures of RCRA Permit Applications	SEN-22-90	HW
Nonhazardous Solid Waste Management Regulations and Criteria (Mississippi)	SW-2	HW
Texas Tier Two Reporting Forms and Instructions	TCRA, 505-507 SARA Title III	CS
Special Licenses and Permits	TPWC Chapter 43	MR
Birds; Protection of Nongame Birds; Destroying Nests or Eggs	TPWC Chapter 64	MR
Alligators	TPWC Chapter 65	MR
Disposition of Protected Wildlife	TPWC Section 43.024	MR
Alligators in Texas: Rules, regulations, and general information, 2006-2007	TPWD	MR
Texas Regulations for Control of Radiation - General provisions	TRCR part 11	RP
Texas Regulations for Control of Radiation - Fees	TRCR part 12	RP
Texas Regulations for Control of Radiation - Hearing and Enforcement Procedures	TRCR part 13	RP
Standards for Protection Against Radiation - Permissible Doses, Precautionary Procedures, Waste Disposal	TRCR part 21	RP
Notices, Instructions and Reports to Workers; Inspections	TRCR part 22	RP
Radiation Safety Requirements and Licensing and Registration Procedures for Industrial Radiography	TRCR part 31	RP
Licensing of Radioactive Material -Exemptions, Licenses, General Licenses, Specific Licenses, Reciprocity, Transport	TRCR part 41	RP
State Fire Marshall (Explosives)	TX Statute Chapter 417 State Fire Marshall	FP
Fire Protection Engineering for Facilities	UFC 3-600-01	FP
International Conference of Building Officials - Uniform Building Code and Uniform Fire Code	UFC/UBC	FP
Underwriter's Laboratory - Building Materials, Fire Resistance, Fire Prot. Equip., & Haz. Location Equip. Directories	UL	FP
West Hackberry Emergency Response Procedures	WHI 5500.9	EM,FP
West Hackberry Spill Prevention, Control, and Countermeasures Plan	WHL 5400.20	CW

Appendix A2

SPRPMO ES&H Directives

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SPRPMO ES&H Directives

Directive	Description
DOE O 151.1C	Comprehensive Emergency Management System
DOE O 225.1B	Accident Investigations
DOE O 231.1B	Environment, Safety and Health Reporting
DOE O 420.1B Change 1	Facility Safety
DOE O 422.1	Conduct of Operations
DOE O 430.1B Change 1 Change 2	Real Property Asset Management
DOE O 436.1	Departmental Sustainability
DOE O 440.2C Admin Change 1	Aviation Management Safety
DOE O 460.1C	Packaging and Transportation Safety
DOE O 460.2A	Departmental Materials Transportation and Packaging Management
DOE M 440.1-1A	DOE Explosives Safety Manual
DOE M 450.4-1	Integrated Safety Management System Manual
DOE P 450.4A	Safety Management System Policy
SPRPMO O 231.1A Change 1 Change 2	Occurrence Reporting and Processing System
SPRPMO O 420.1C	Conduct of Operations Requirements for SPR Facilities
SPRPMO O 436.1	Site Sustainability
SPRPMO O 440.2B	Aviation Implementation Plan
SPRPMO O 451.1D	National Environmental Policy Act Implementation Plan

SPRPMO ES&H Directives

Directive	Description
SPRPMO P 451.1C	SPR Environmental Policy
SPRPMO N 450.5B	Strategic Petroleum Reserve Environmental, Security, Safety & Health, and Emergency Preparedness Goals FY2011
SPRPMO N 450.1	Implementation of Environmental, Safety and Health Contractor Requirements Documents

Appendix B

DOE Policy
SPRPMO Policy 451.1C, “Environmental Policy Statement”

DM Policy
ASP5400.2, “Environmental Policy”

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U. S. Department of Energy
STRATEGIC PETROLEUM RESERVE PROJECT MANAGEMENT OFFICE
New Orleans, La.

POLICY

SPRPMO P 451.1C

APPROVED: **02/18/09**

SUBJECT: SPR ENVIRONMENTAL POLICY

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1. **PURPOSE AND SCOPE.** This environmental policy applies to the facilities and pipelines that comprise the Strategic Petroleum Reserve (SPR). The mission of SPR is to store petroleum and maintain drawdown readiness. Protection of the environment, workers, and the public are responsibilities of paramount importance. To control environmental impact, the goal of the Department of Energy (DOE) and SPR contractors is to design, develop, construct, operate, and maintain facilities and operations in a manner that shall be resource-efficient and will protect the quality of the environment consistent with our mission. Environmental protection will be integrated at all management levels and into all phases of activity.

   This environmental policy is implemented by SPR top management through an environmental management system (EMS) under an integrated safety management umbrella.

2. **POLICY STATEMENT.** The SPR operates only in an environmentally responsible manner.

   Environmentally responsible manner means that top management pledges all functional levels will:

   a. Comply with applicable Federal, state, and local environmental legal, regulatory, and other requirements which relate to the environmental aspects of SPR activities;

   b. Prevent pollution by undertaking measures to prevent the generation of wastes, and other residual materials requiring disposal or release to the environment through recycling, reuse, and source reduction. Where the generation of such wastes cannot be avoided, the SPR Project Management Office (PMO) will take action to reduce their volume and toxicity and ensure proper disposal; and

   c. Continually improve environmental performance via the EMS and by establishing and maintaining documented environmental objectives and targets.

DISTRIBUTION: All SPR Employees **INITIATED BY:**

This Environmental Policy provides the framework for setting and reviewing environmental objectives and targets that assure excellence in environmental management. It is communicated to all persons working for or on behalf of the SPR, and is available on request at all SPR facilities and electronically on-line at www.spr.doe.gov and www.dynmcdermott.com.

The SPR Environmental, Safety and Health Division of Technical Assurance is responsible for prompting the periodic review of this Policy by DOE and DynMcDermott Petroleum Operations Company top management as well as its update.

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

POLICY

DynMcDermott Petroleum Operations Company

RESPONSIBLE FUNCTION: DM ENVIRONMENTAL **AUTHOR:** GABRIEL ADAMS DM Environmental Compliance Specialist **OWNER:** BILL BOZZO DM ES&H Director	**SUPERSEDES:** ASP5400.2 3.1, "ENVIRONMENTAL POLICY" **APPROVED BY:** See E-Mail Approval R. MCGOUGH, DM PROJECT MANAGER	**POLICY NO: ASP5400.2** **VERSION: 3.2** **PAGE 3**

TITLE: ENVIRONMENTAL POLICY

Effective Date: 10/28/2010

Directing Documents:
a) International Organization for Standardization. ISO 14001:2004(E), "Environmental Management Systems Requirements with Guidance for Use"
b) Executive Order 13423, "Strengthening Federal Environmental, Energy, and Transportation Management"
c) DOE O 430.2B, "Departmental Energy, Renewable Energy and Transportation Management"
d) DOE O 450.1A, "Environmental Management Program"
e) SPRPMO P 451.1C, "SPR Environmental Policy"
f) Executive Order 13514, "Federal Leadership in Environmental, Energy, and Economic Performance"

Policy Statement: **The Strategic Petroleum Reserve operates only in an environmentally responsible manner.**

Environmentally responsible manner **means that top management pledges all functional levels will:**

- **comply with applicable legal and other requirements to which the SPR subscribes which relate to the environmental aspects of SPR activities,**
- **prevent pollution though design, processes, practices, techniques, materials, products and services so that detrimental environmental impact is reduced or eliminated, and**
- **continually improve environmental performance through the EMS.**

This environmental policy is implemented by top management of DynMcDermott Petroleum Operations Company (DM) through an environmental management system (EMS) under an integrated safety management (ISM) umbrella.

This environmental policy applies to the facilities and pipelines comprising the Strategic Petroleum Reserve (SPR) and managed and operated by DM. The mission of the SPR is to store petroleum and maintain drawdown readiness. Protection of the environment, workers, and the public are responsibilities of paramount importance. To control environmental impact, DM and its contractors who work at the SPR endorse environmental protection at all management levels and integrate it into all phases of activity – from concept, design, development, and construction, to operation, maintenance, and decommissioning.

This environmental policy provides the framework for setting and reviewing environmental objectives and targets that assure excellence in environmental management. It aligns with the DOE SPR Environmental Policy (SPRPMO P 451.1C) which is communicated to all persons working for or on behalf of the SPR by DOE. This DM Environmental Policy is available on request at all SPR facilities and electronically on-line at www.dynmcdermott.com .

Functional Oversight: The DM Environmental Department is responsible for assuring the periodic review of this policy by DM top management as well as its update.

Version History – Significant Changes		
Version	Description	Effective Date
3.2	Added additional driver of EO 13524 which extends and enhances the previously incorporated EO 13423.	10/28/2010
3.1	The SPR Environmental Policy (SPRPMO P 451.1C) was added as a directing document. Minor revisions were made to focus the scope of the policy on DM and DM contractors. This policy also aligns with and supports the DOE SPR Environmental Policy. History description for version B0 was added.	12/7/09
3.0	This is a complete revision structured after policy requirements set by ISO 14001:2004 standard with respective information from previous DOE and DM environmental policies.	12/9/08

Version History – Significant Changes		
Version	Description	Effective Date
2.0	Minor revisions were made to the scope of the policy and to align this policy with the DOE Environmental Policy (SPRPMO P 451.1B) and the DOE ES&H Manual (SPRPMO M 450.1-1A).	11/29/07
1.0	Versioning was changed to 1.0 in concert with requirements of the new Documentum document management system. In Section A., misuse of resources was added as a negative environmental impact, and environmental enhancement was added as a means of creating positive environmental impact.	11/21/06
K1	Minor revisions include deletion of “Draft” from header on pages 2 through 4 of the document and addition of effective date for K0 on this version history table. No significant content changes were made. Revision bars from the K0 version were left in this version.	12/20/05
K0	Policy was revised to support requirements of the ISO 14001:2004 Standard.	12/02/05
J0	Policy was re-formatted in accordance with the DM Document Control and Management Program. Functional oversight for the policy was added. The policy is now more accessible to the Public through the DM website (added web address in paragraph D).	12/15/04
I0	Added wording that more explicitly states that DM will be involved in community environmental outreach in section B. Revision bars in the right margin mark the changed paragraphs.	12/05/03
H0	Added wording that more clearly states: top management’s commitment to compliance and continual improvement (see B below), the framework for establishing and reviewing objectives and targets (C), and requirements for revision of the policy (E). Revision bars in the right margin mark the changed paragraphs.	11/11/02
G0	Deleted specific responsibilities from this document and revised to contain only policy information. The deleted information is covered in other documents.	11/29/01

Version History – Significant Changes		
Version	Description	Effective Date
F0	Changed “ES&H’ to “ES&Q”. Deleted section 4.J, Quality Assurance, and moved 4.J.[1] under 4.B, ES&Q Director. Changed the term “independent assessment” under 4.J.[1] to “management appraisal”. Deleted section 4.M., Information Systems. Other minor changes were made to sentence structure. Changed paragraphs are marked with a revision bar in the right margin.	5/01/01
E0	Combined subsections 3.3.B and 3.3.C into a single paragraph entitled Prevention of Pollution and added the words “prevent pollution” to 3.2. Expanded wording in 3.3.D., Compliance, regarding other requirements. In section 4, responsibilities, added environmental management system representative and general responsibilities. Changed paragraphs are marked with a revision bar in the right margin.	4/28/00
D0	Added the following policy statement “DynMcDermott operates only in an environmentally responsible manner.” (3.1) Added 4.C.[1]h. which states that the environmental manager will “assign a person to fill the role of environmental management system coordinator.” Changed paragraphs are marked with a revision bar in the right margin.	2/10/00
C0	Completely revised in a new format. Revised the reference list. Incorporated material to conform to the ISO 14001 standard. Incorporated policy on waste management in section 3. Added project manager responsibilities. Added environmental manager responsibility. Added Human Resources and Development and Information Systems responsibilities. Added responsibilities of managers and employees. Changed paragraphs are marked with a revision bar in the right margin.	7/27/98

Version History – Significant Changes		
Version	Description	Effective Date
B0	Revised the reference list and added definitions. Incorporated recent regulatory pollution prevention guidelines. Added policy on waste management. Changed project manager responsibilities to ES&H director. Revised responsibilities of the environmental manager and Operations and Maintenance. Added responsibilities for Engineering and Construction and Quality Assurance. Placed responsibilities of the subcontract manager's technical representative in a separate list.	10/18/96
A0	New document.	12/17/93

END OF DOCUMENT

End of Appendix

Appendix C

GROUND WATER SURVEILLANCE MONITORING

DURING 2012

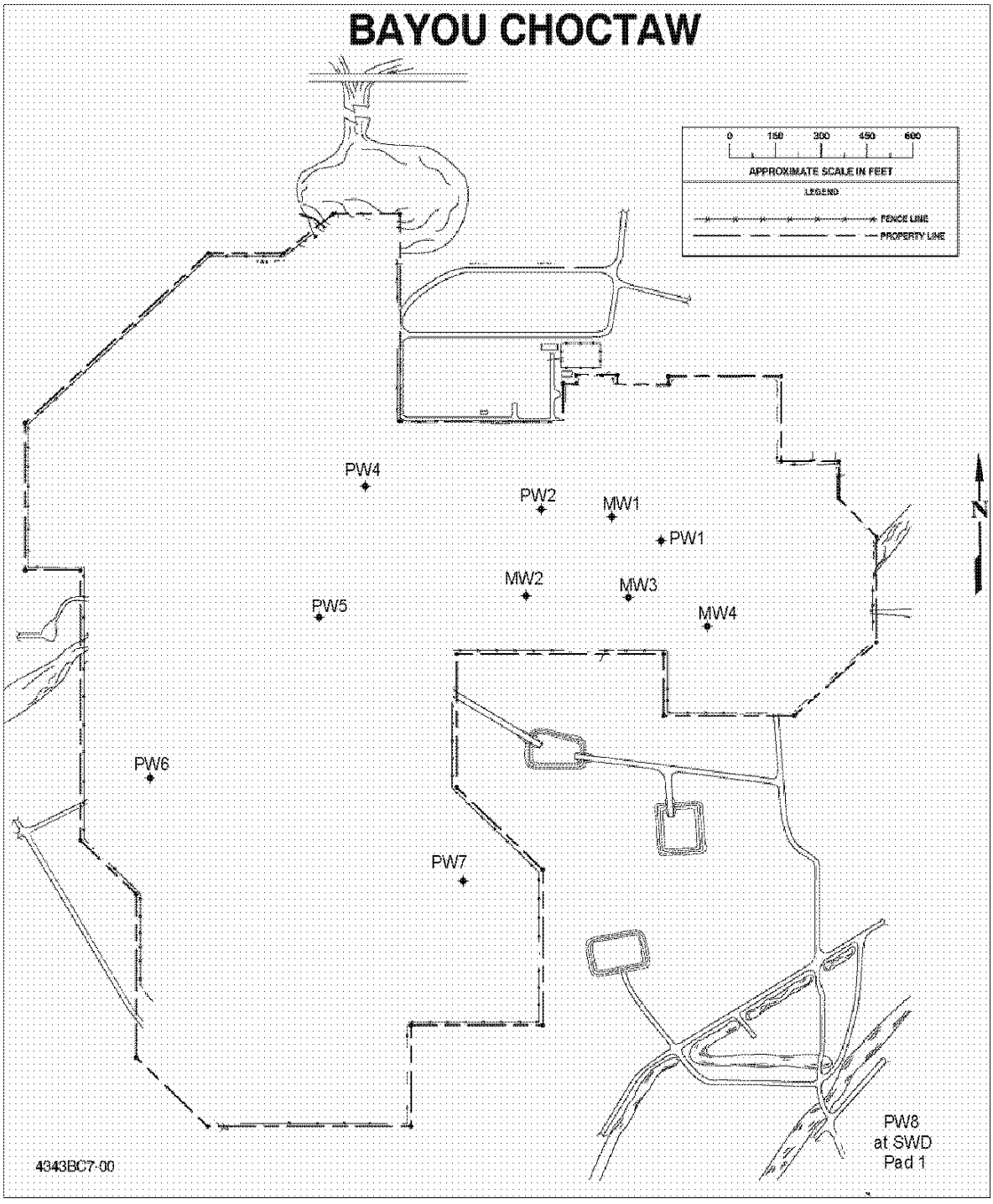


Figure C-1. Bayou Choctaw Ground Water Monitoring Stations

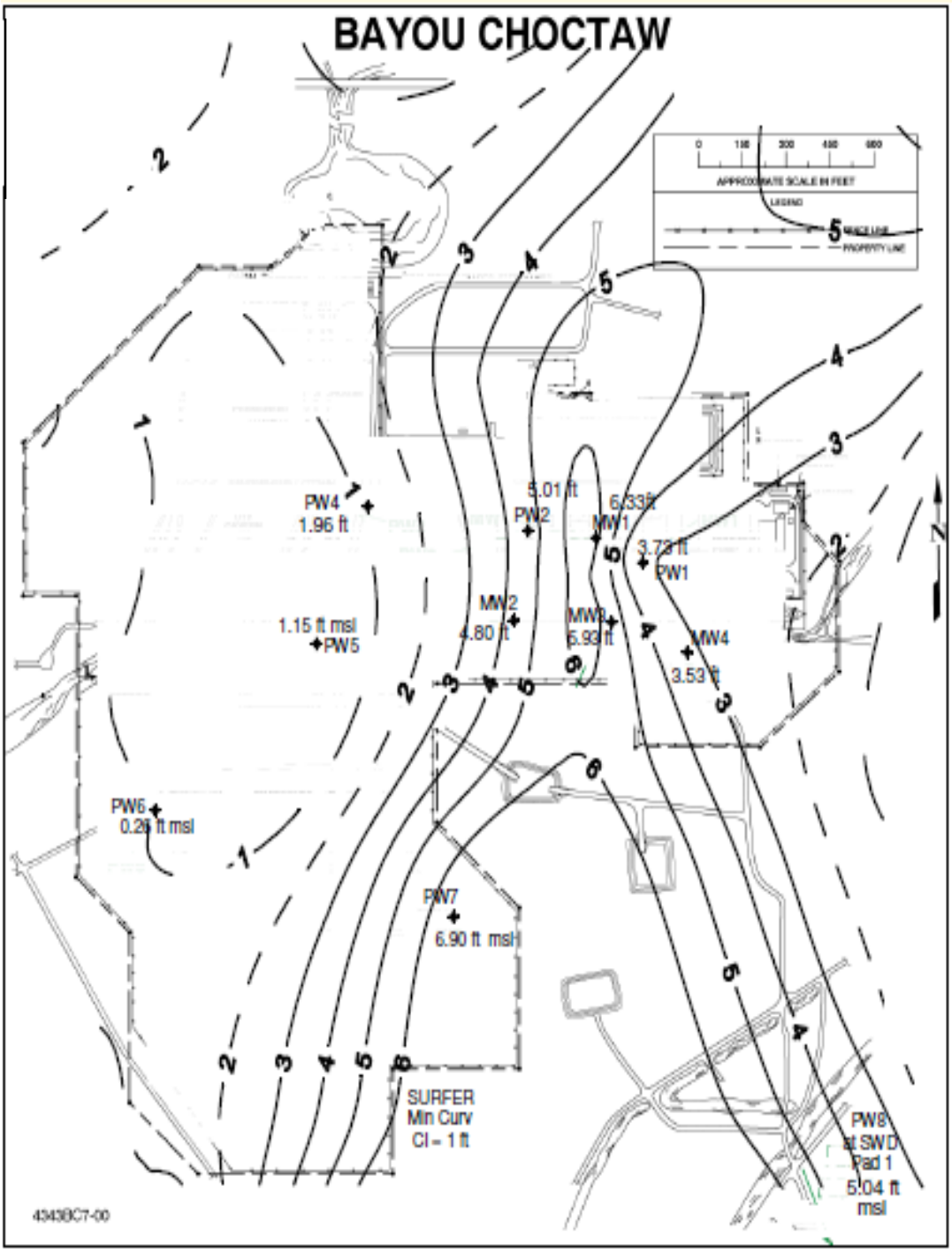


Figure C-2. Bayou Choctaw Ground Water Contoured Elevations Fall 2012

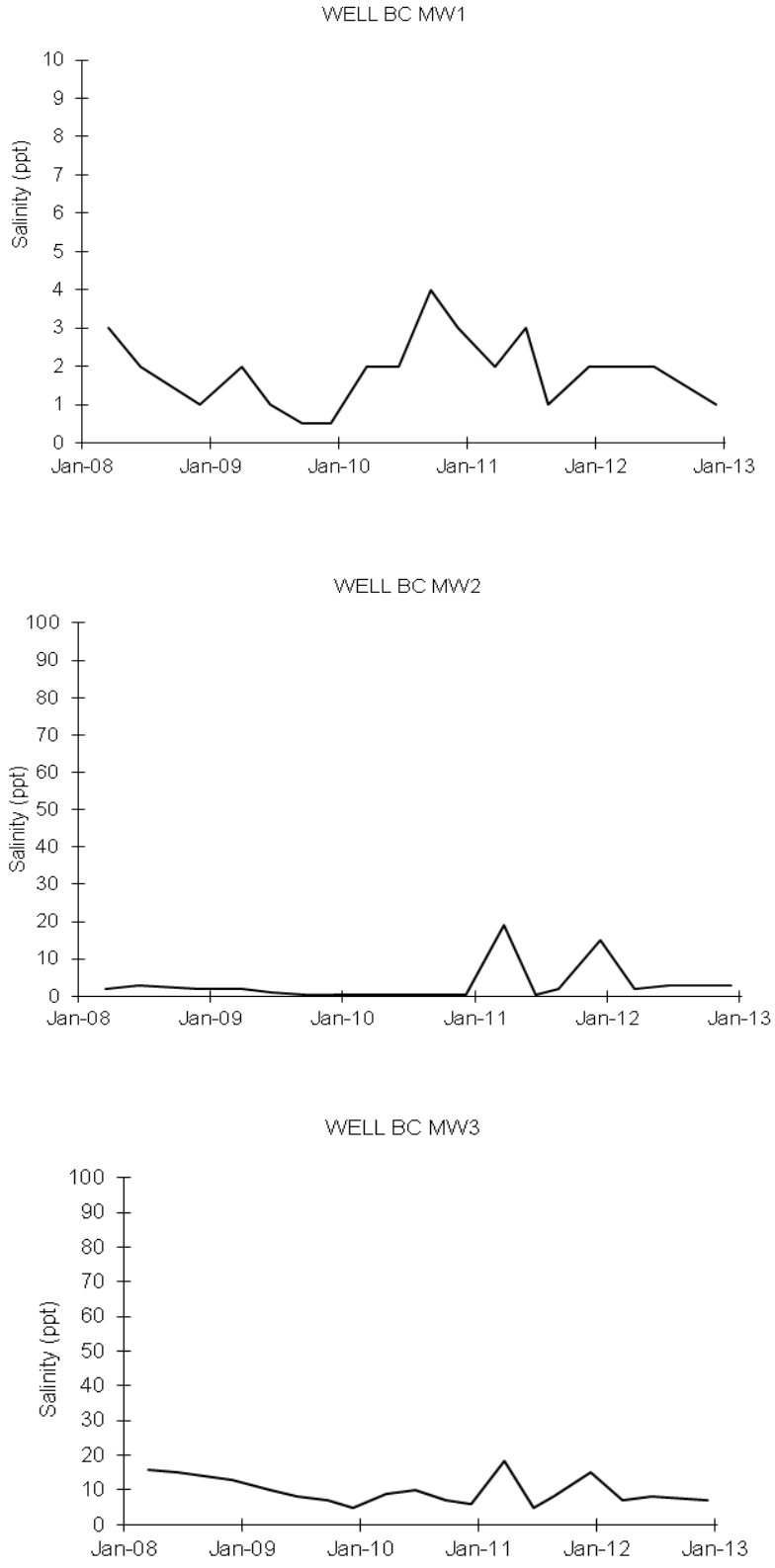


Figure C-3. Bayou Choctaw Ground Water Monitoring Well Salinities

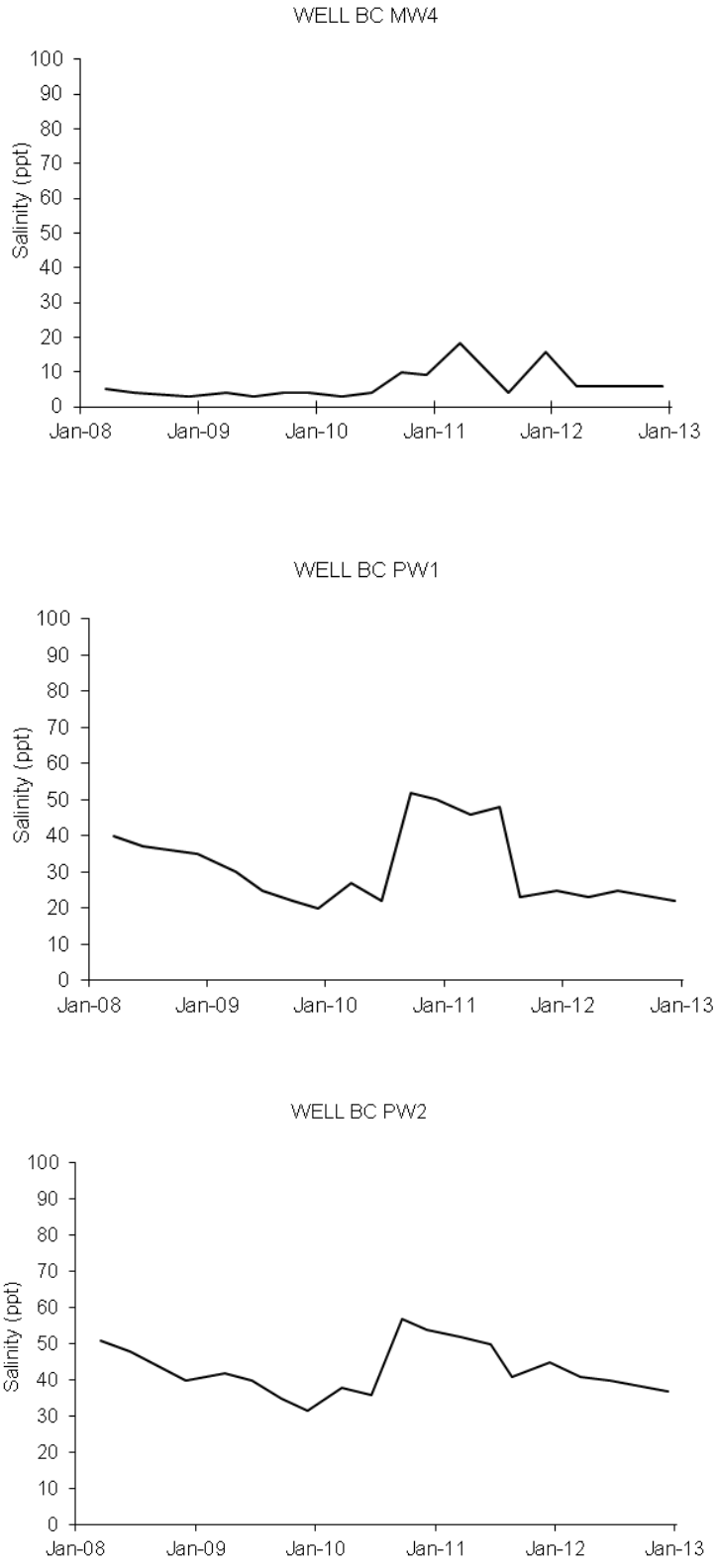


Figure C-3. Bayou Choctaw Ground Water Monitoring Well Salinities (continued)

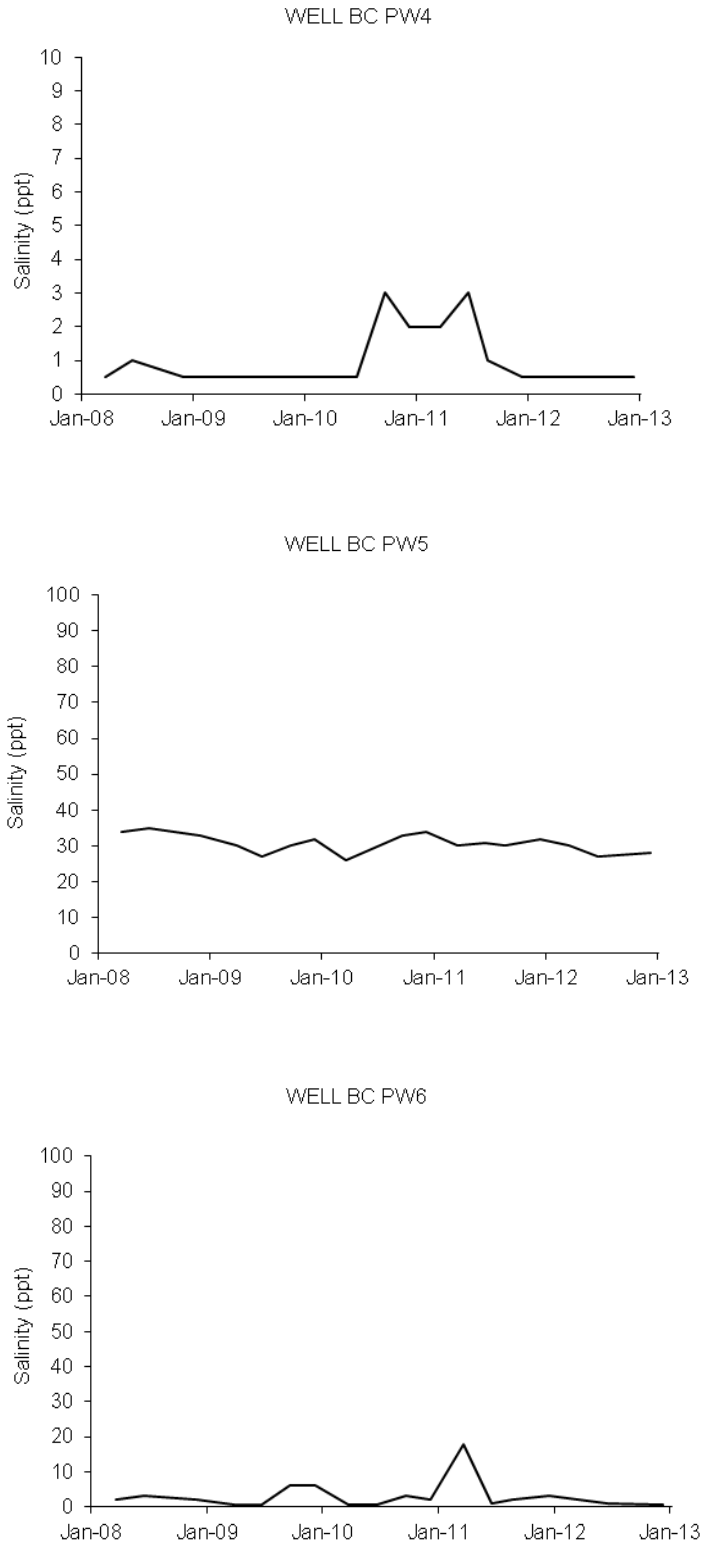


Figure C-3. Bayou Choctaw Ground Water Monitoring Well Salinities (continued)

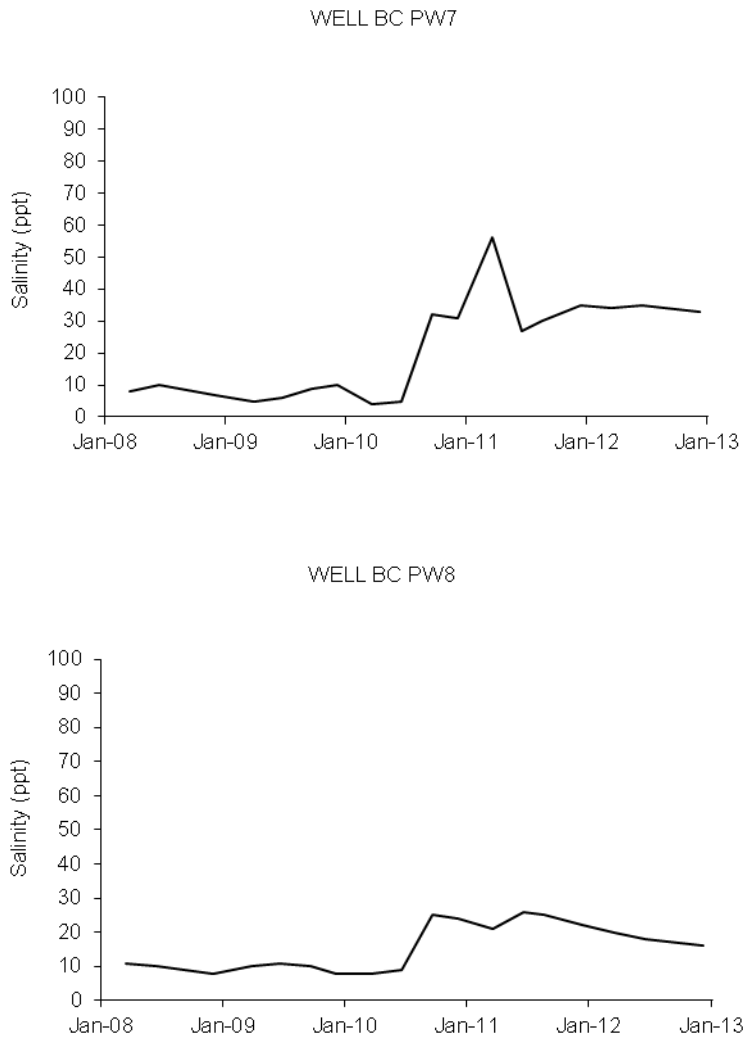


Figure C-3. Bayou Choctaw Ground Water Monitoring Well Salinities (continued)

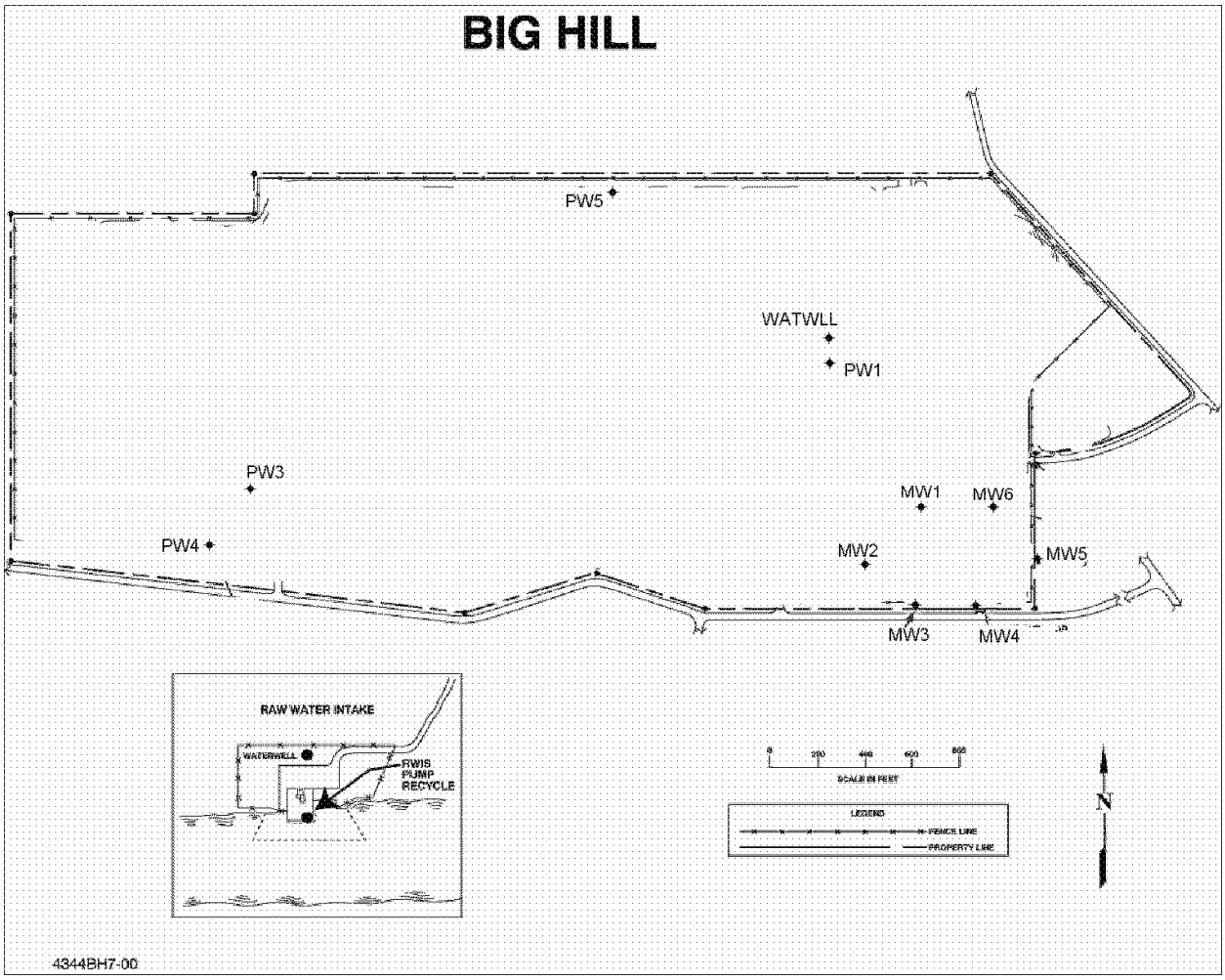


Figure C-4. Big Hill Ground Water Monitoring Stations

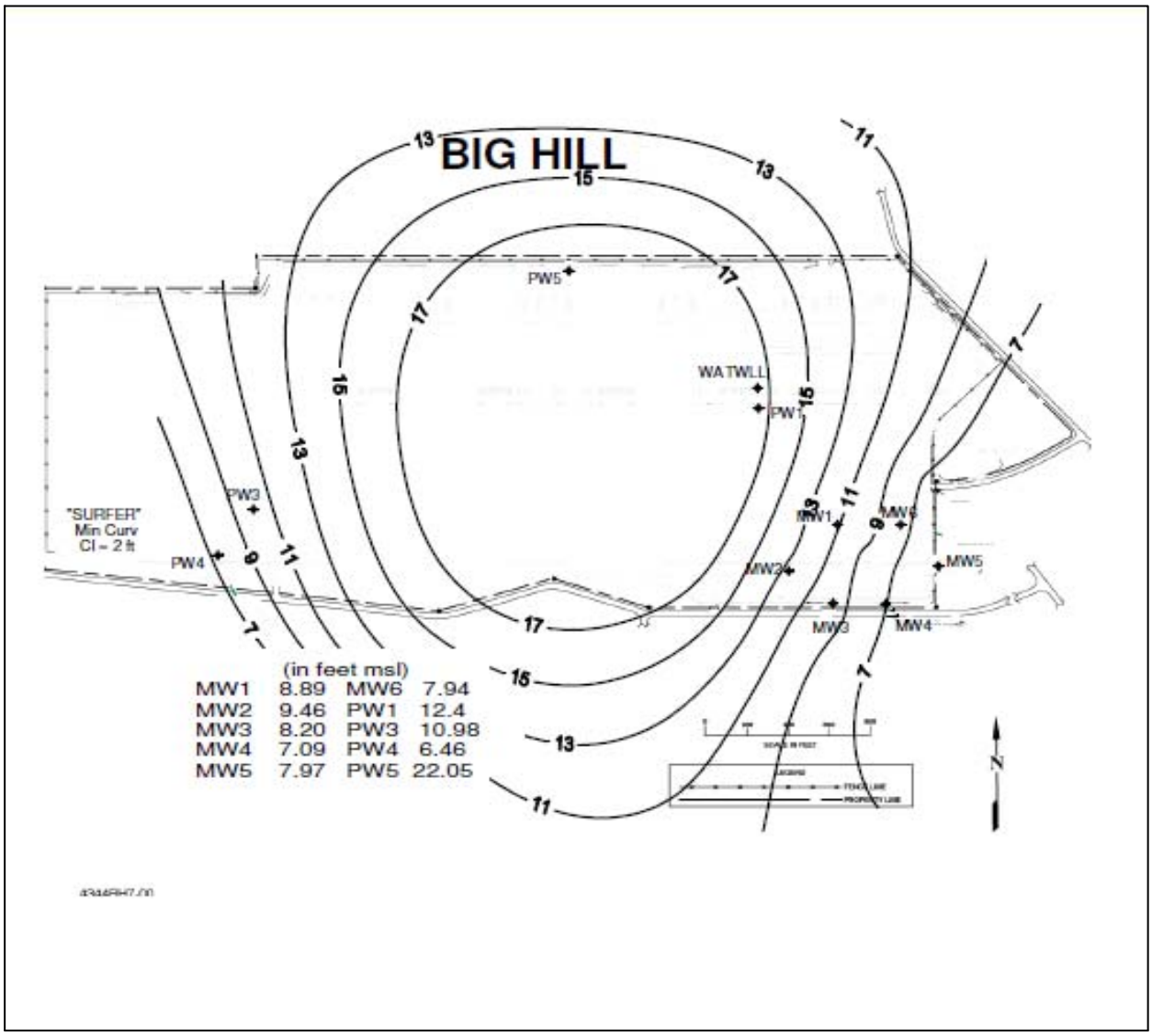


Figure C-5. Big Hill Ground Water Contoured Elevations Fall 2012

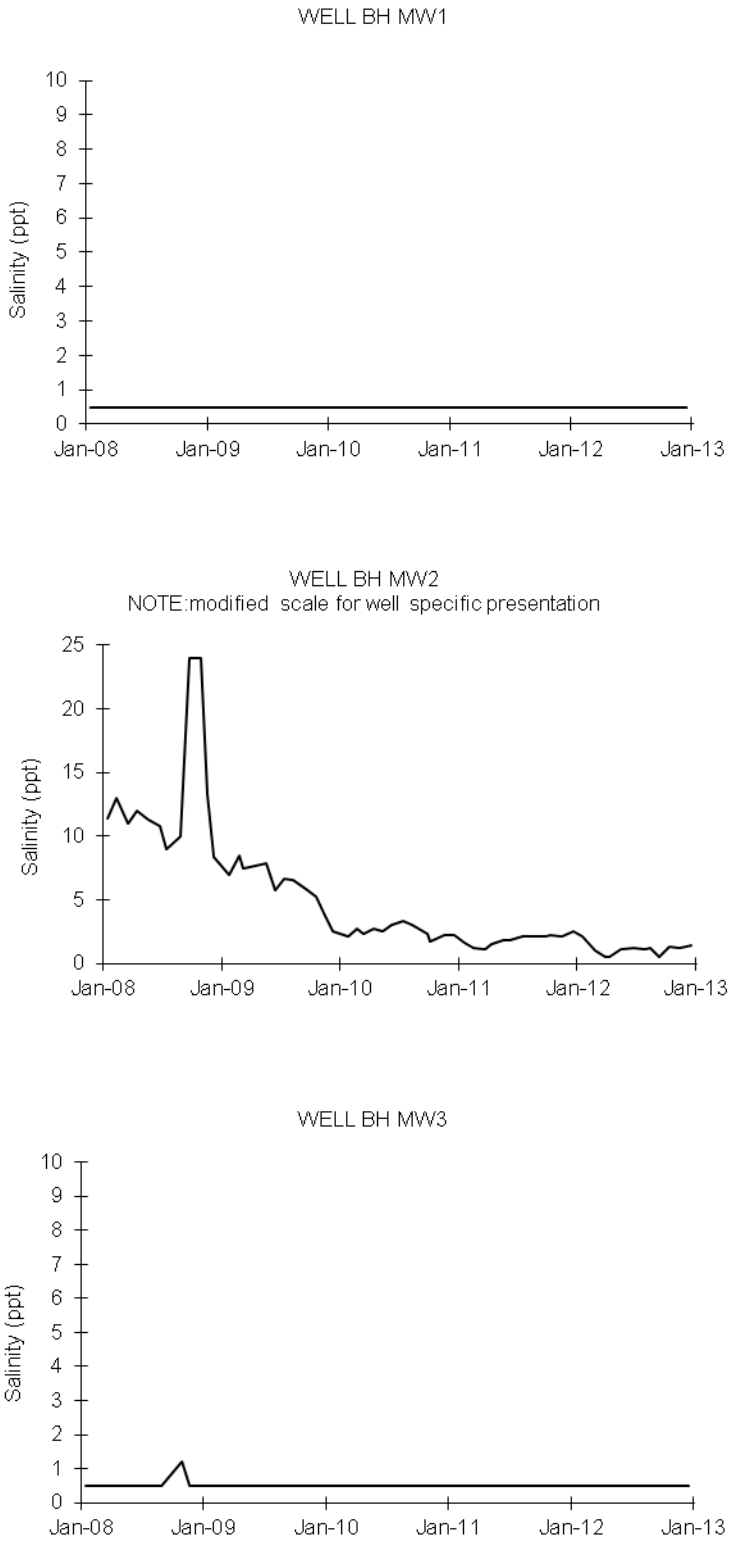


Figure C-6. Big Hill Ground Water Monitoring Well Salinities

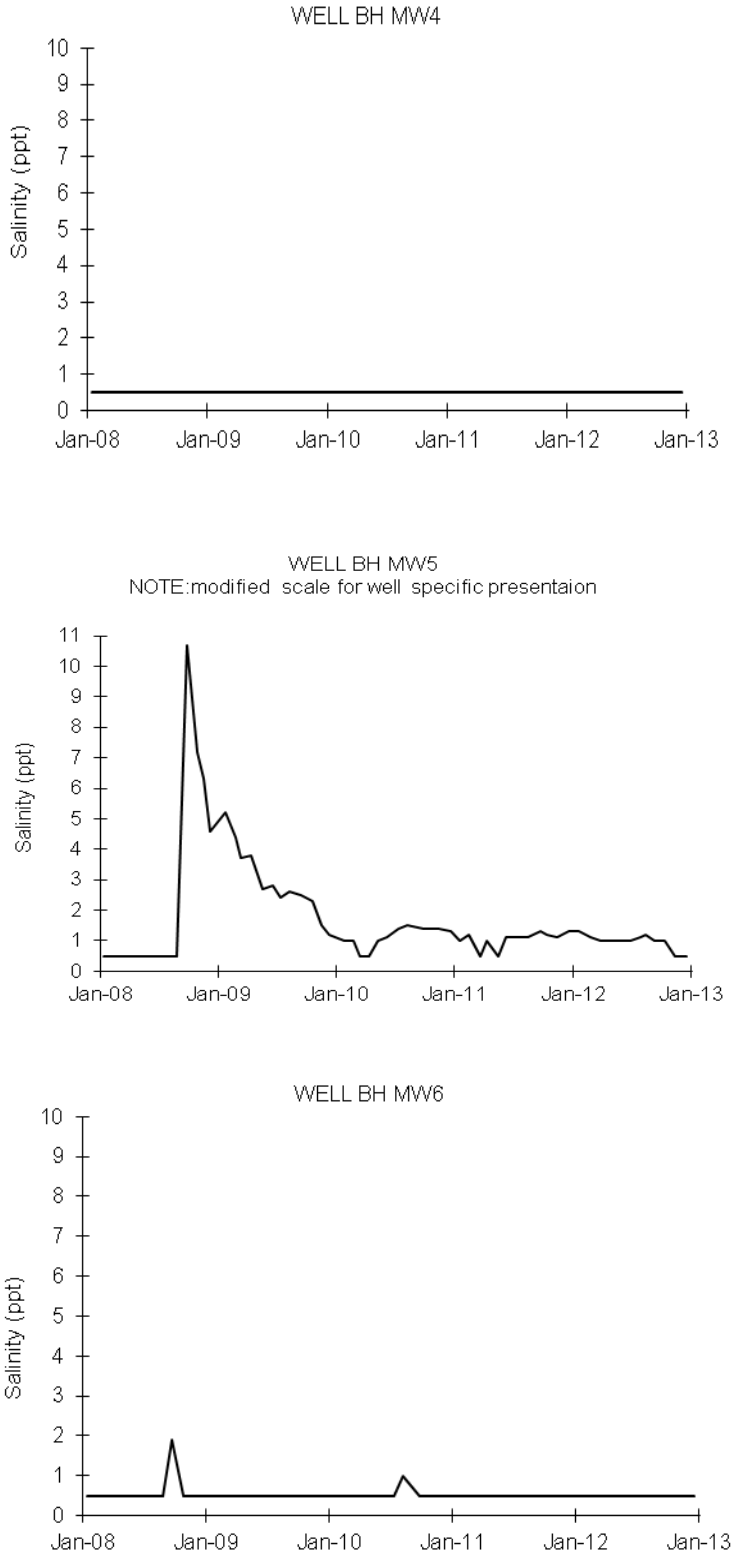


Figure C-6. Big Hill Ground Water Monitoring Well Salinities (continued)

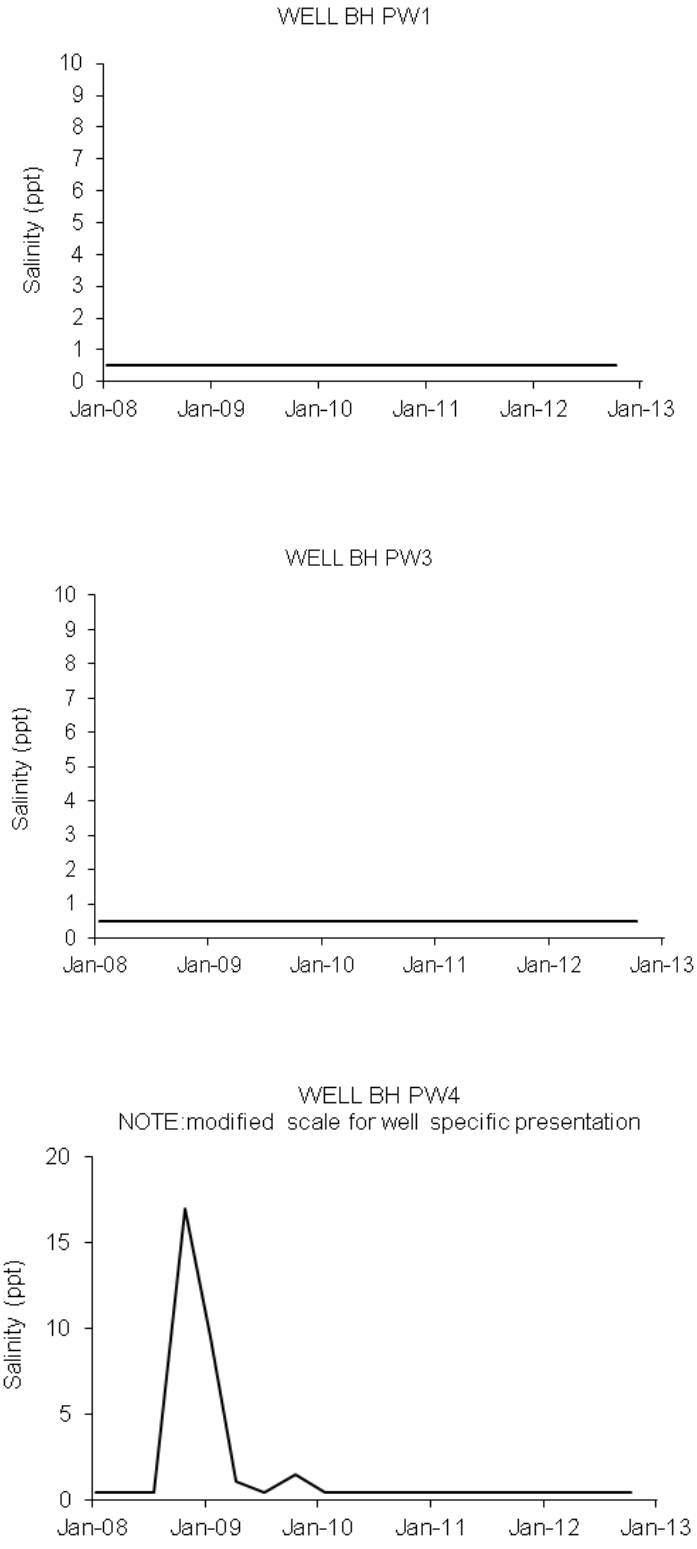


Figure C-6. Big Hill Ground Water Monitoring Well Salinities (continued)

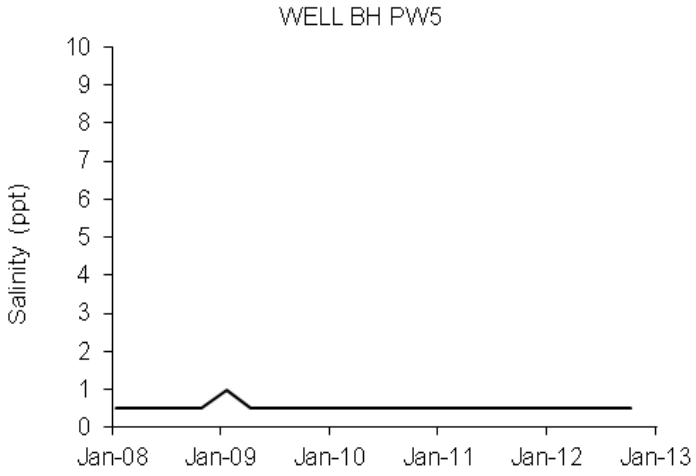


Figure C-6. Big Hill Ground Water Monitoring Well Salinities (continued)

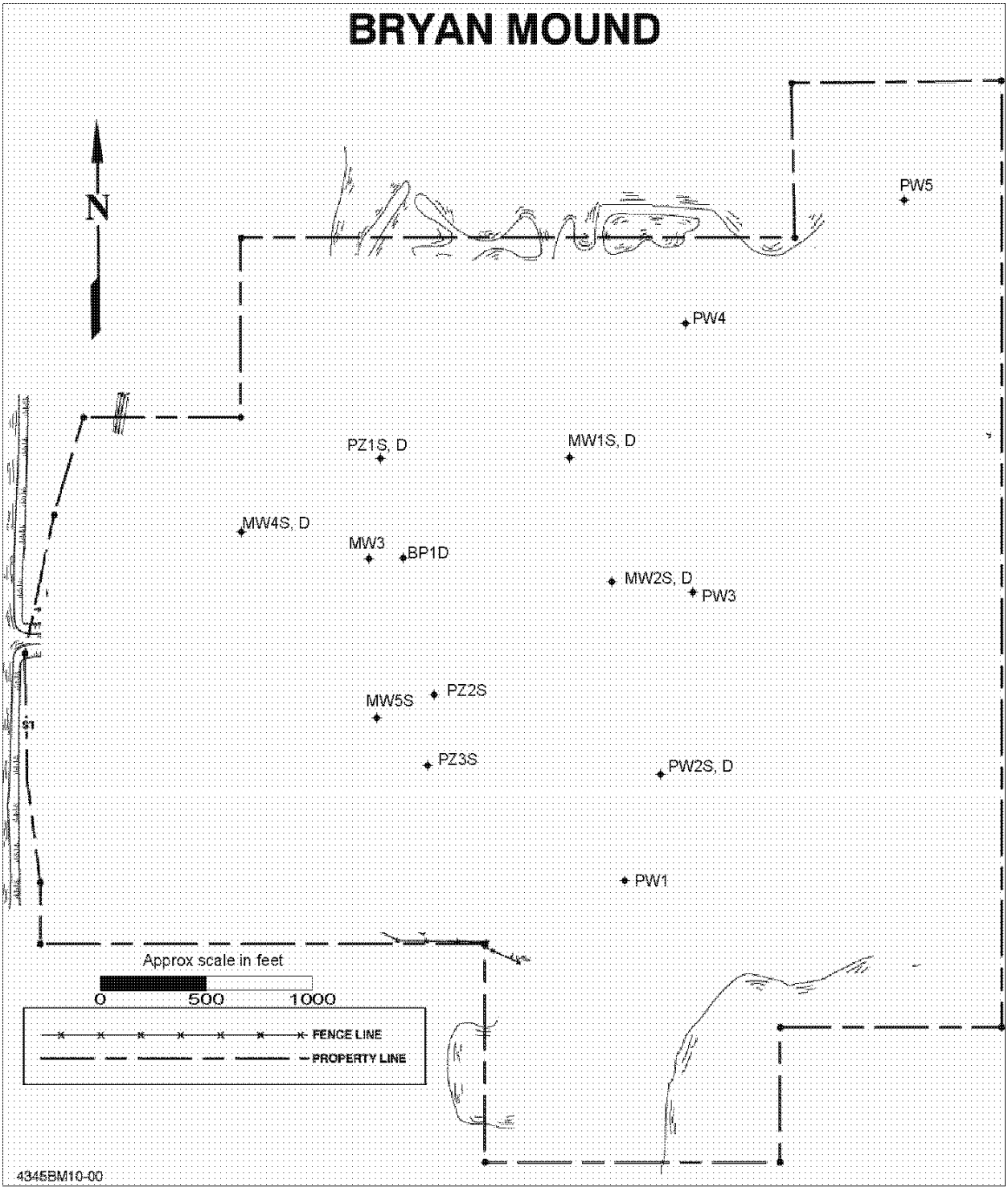


Figure C-7. Bryan Mound Ground Water Monitoring Stations, Deep and Shallow

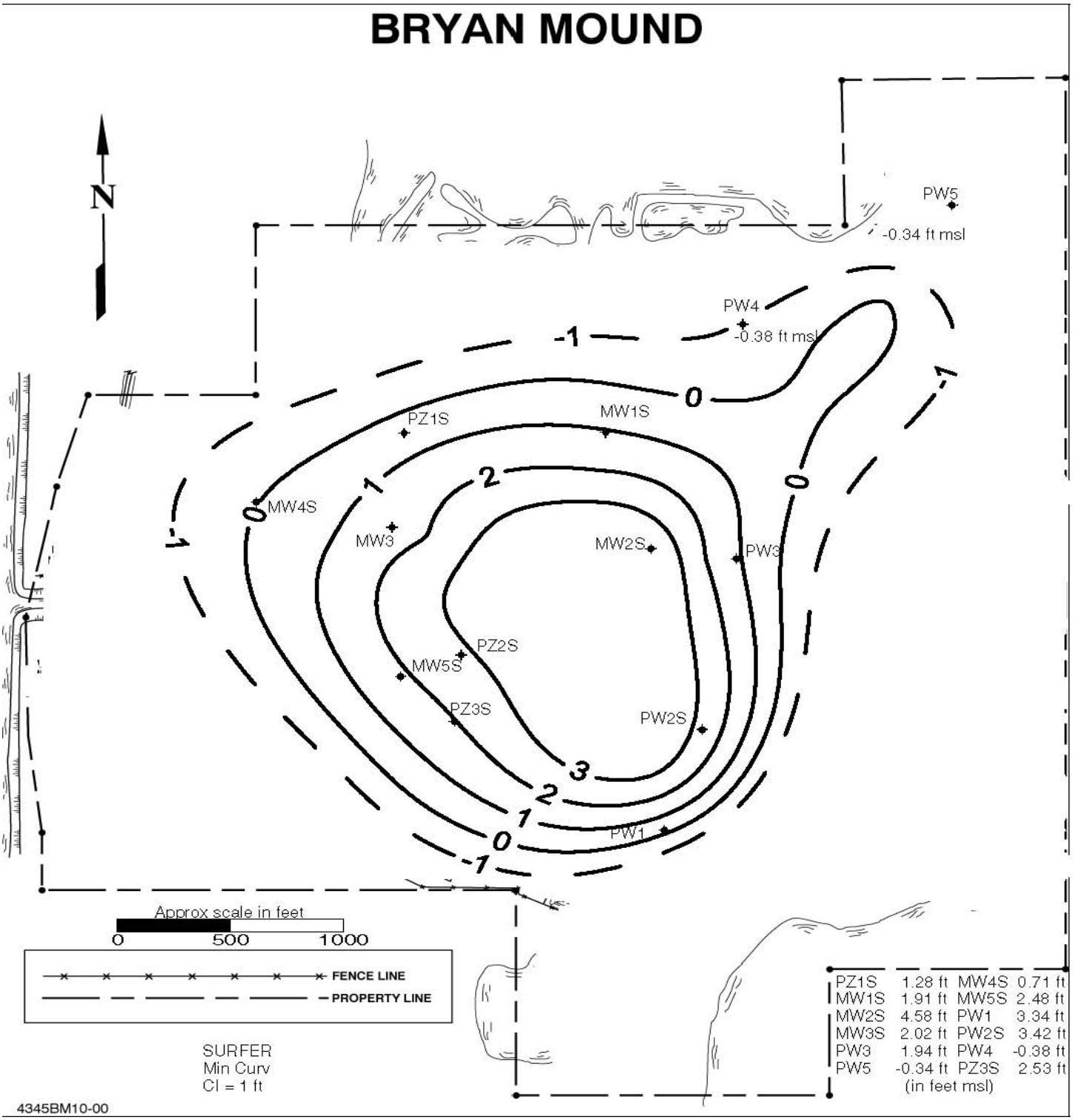


Figure C-8. Bryan Mound Shallow Ground Water Zone Contoured Elevations Fall 2012

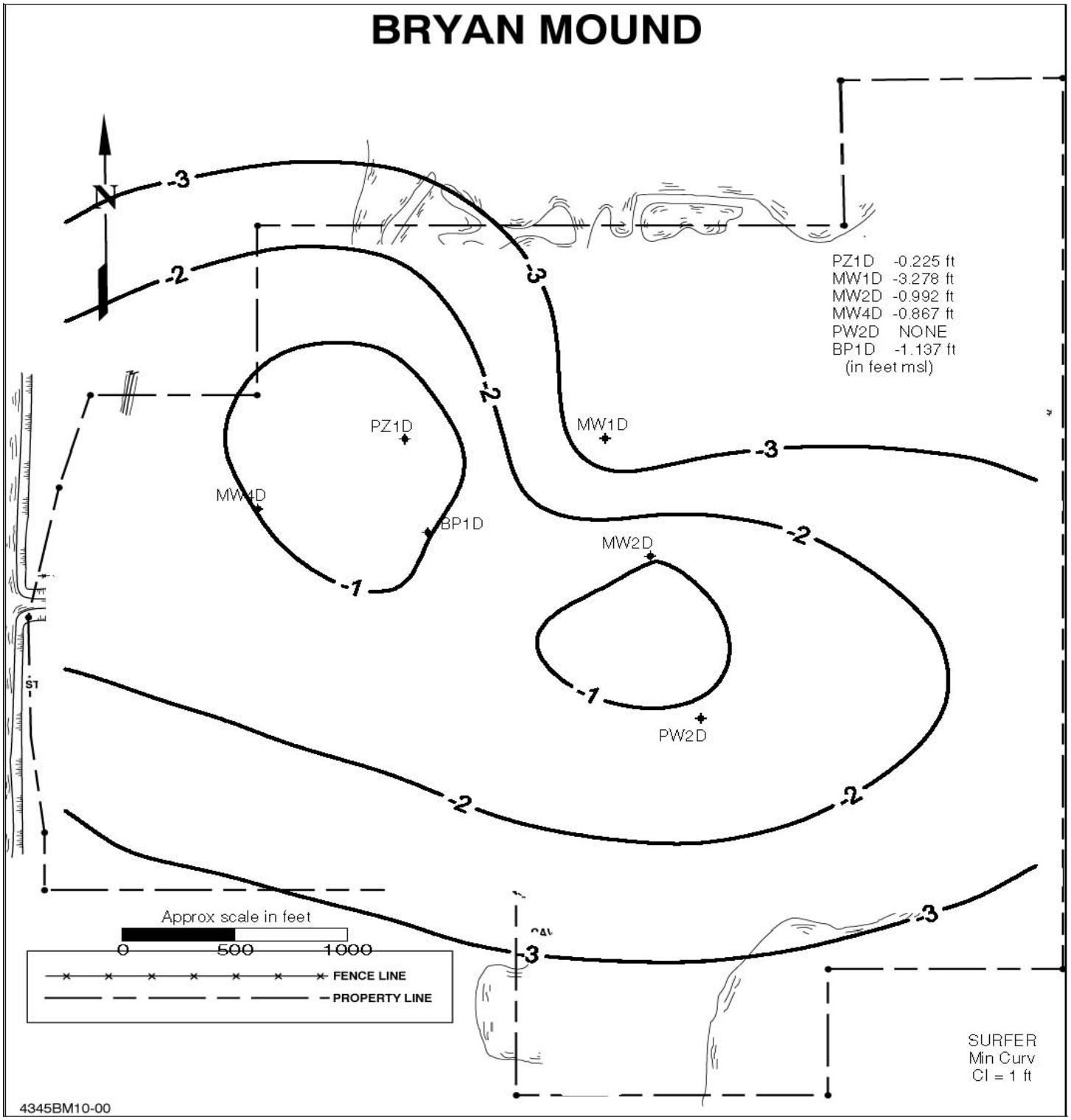


Figure C-9. Bryan Mound Deep Ground Water Zone Contoured Elevations Fall 2012

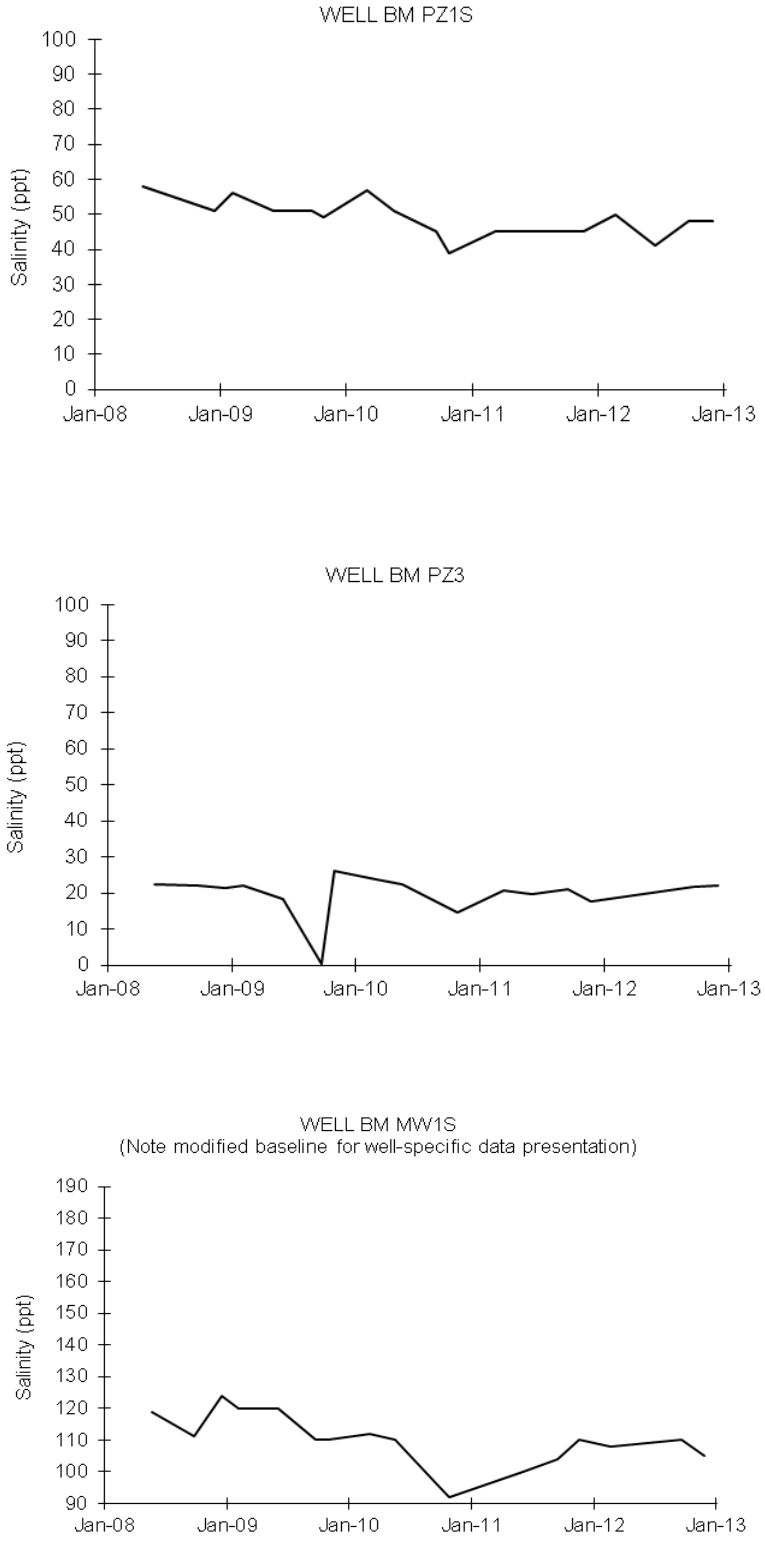


Figure C-10. Bryan Mound Ground Water Monitoring Well Salinities

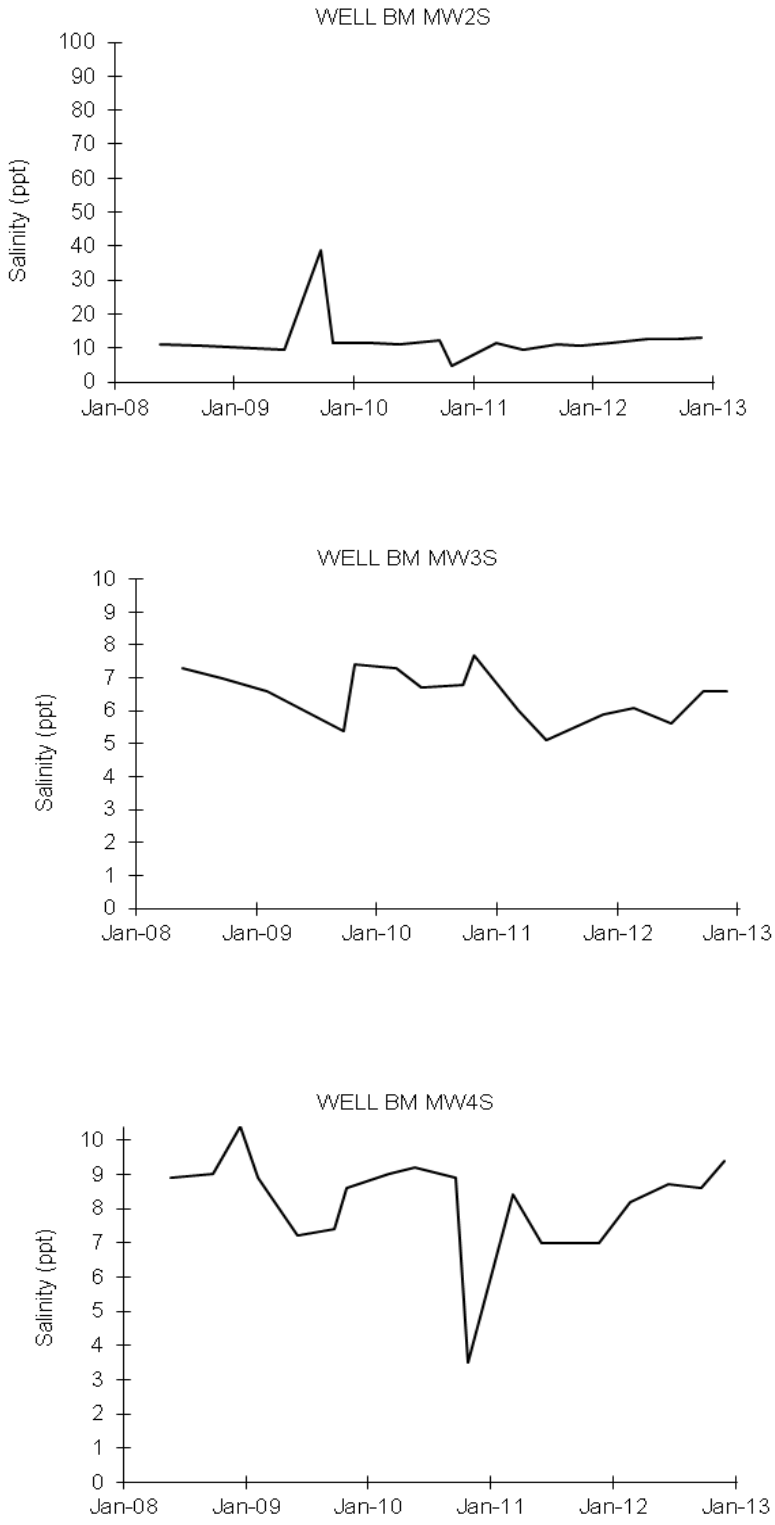


Figure C-10. Bryan Mound Ground Water Monitoring Well Salinities (continued)

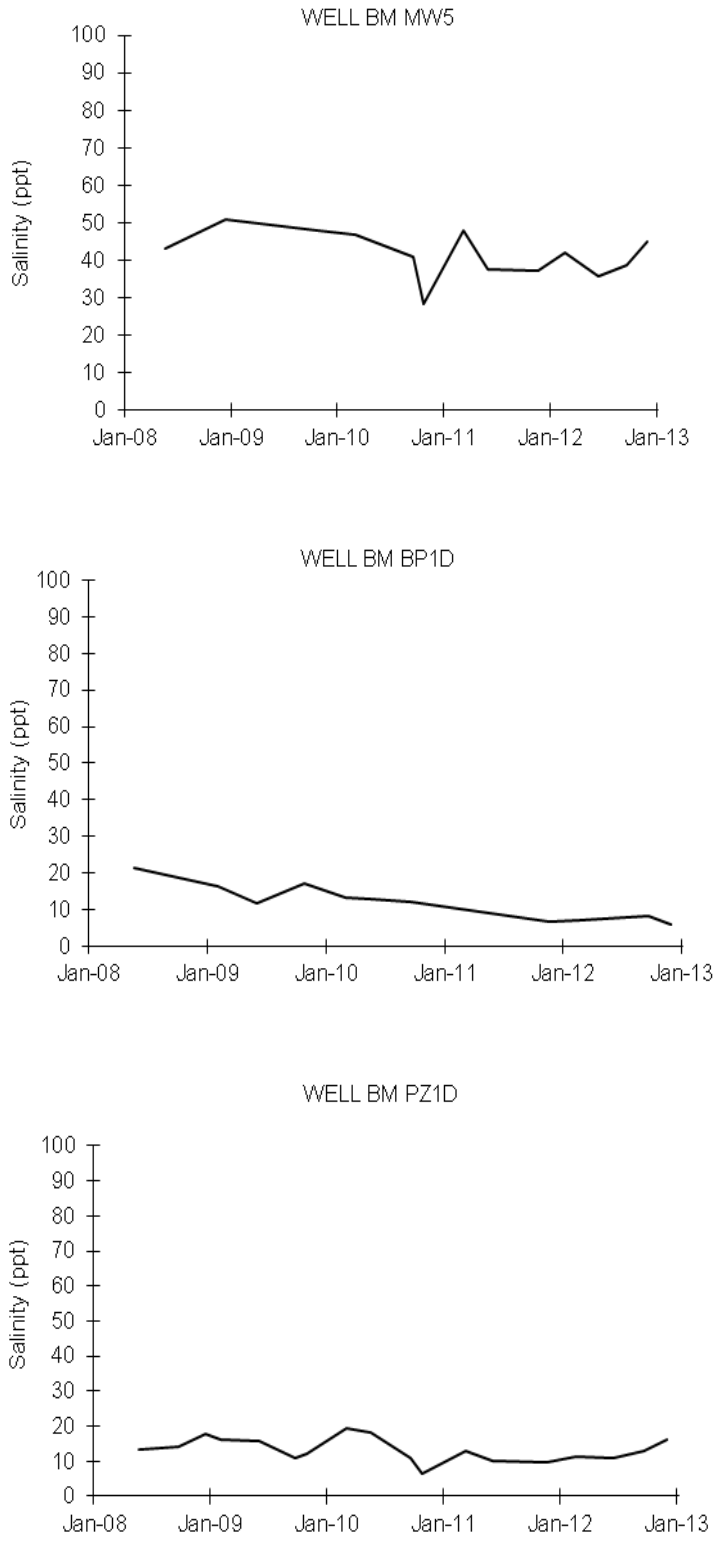


Figure C-10. Bryan Mound Ground Water Monitoring Well Salinities (continued)

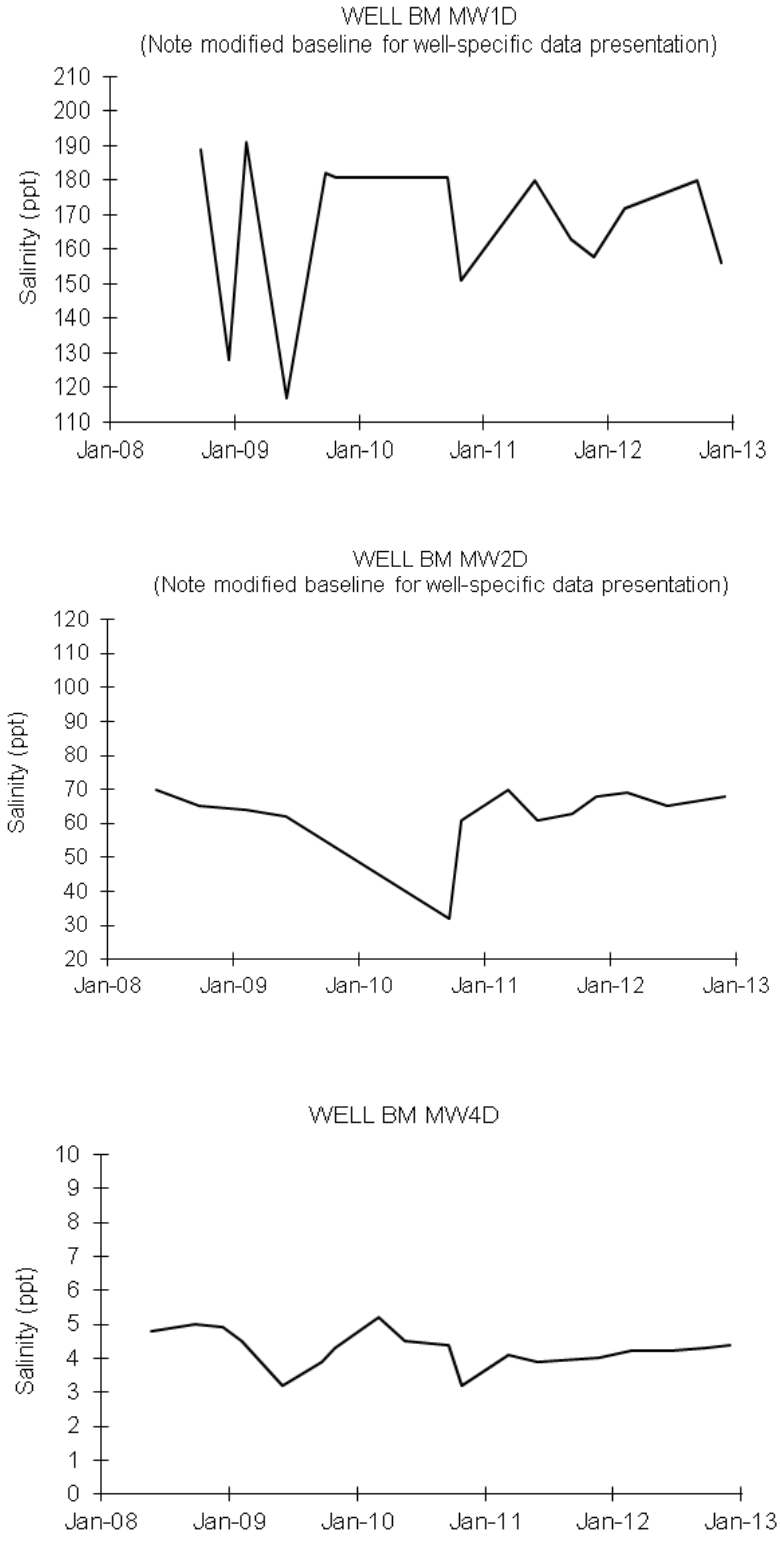


Figure C-10. Bryan Mound Ground Water Monitoring Well Salinities (continued)

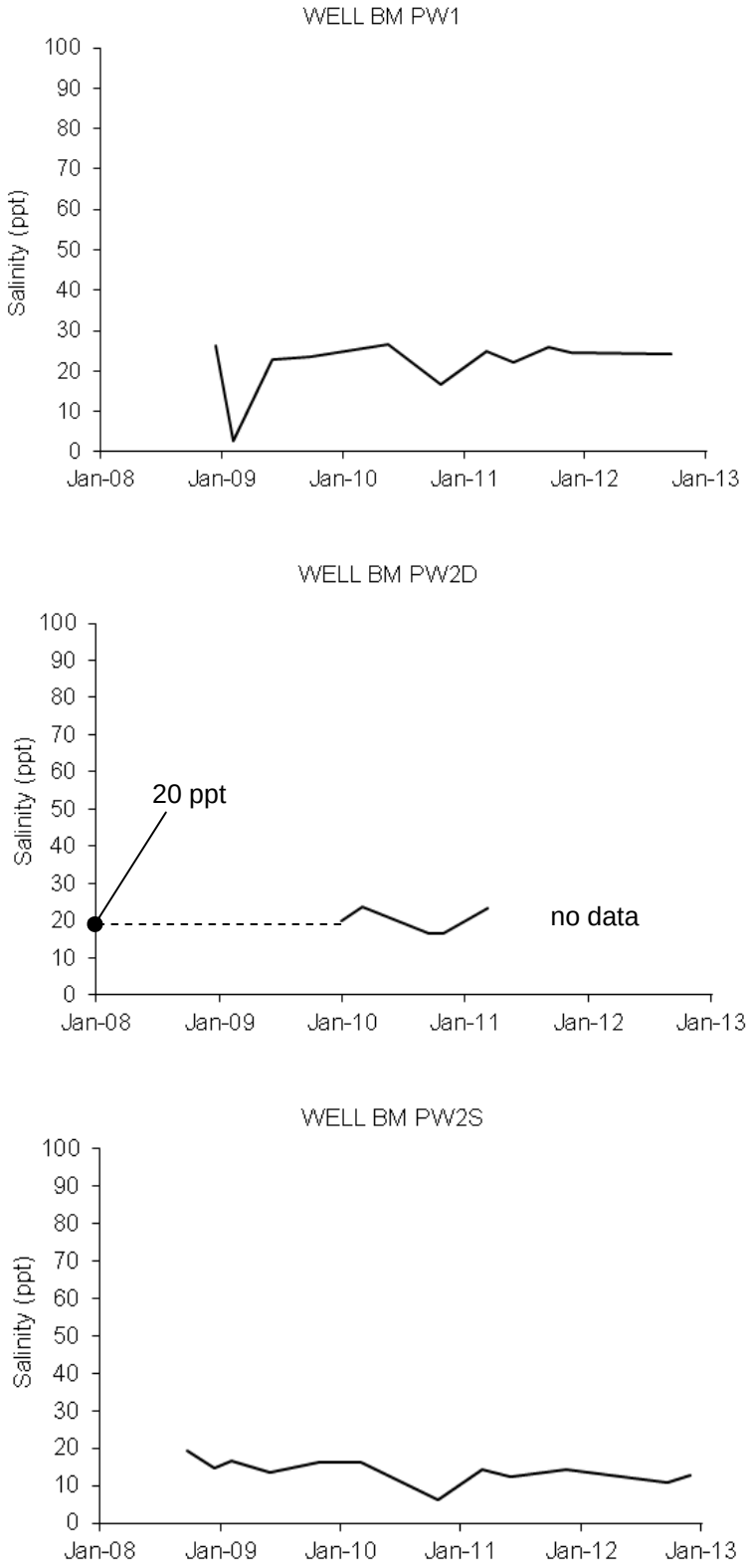
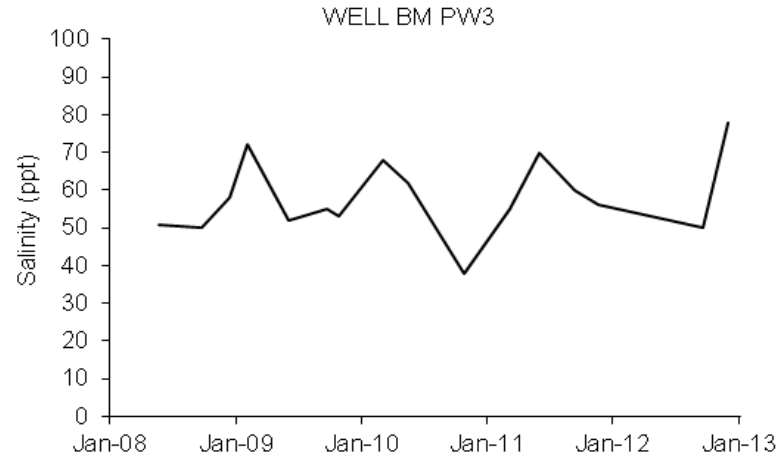
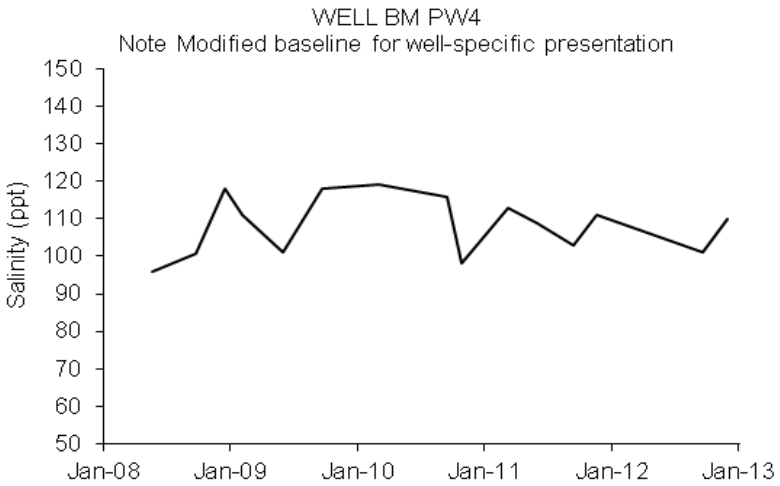


Figure C-10. Bryan Mound Ground Water Monitoring Well Salinities (continued)





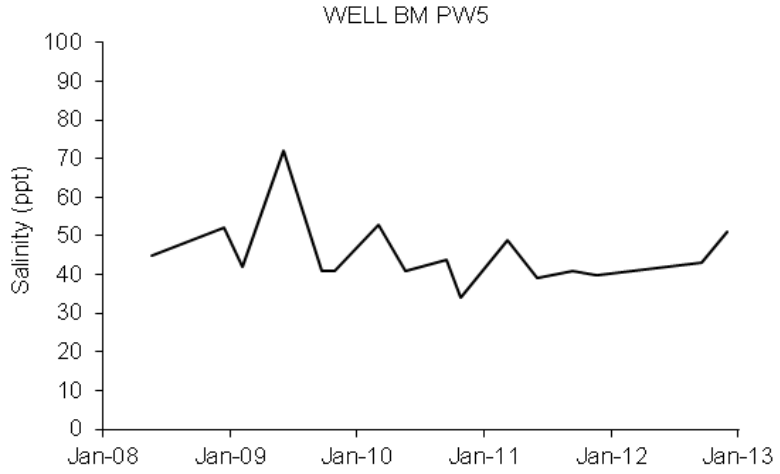


Figure C-10. Bryan Mound Ground Water Monitoring Well Salinities (continued)

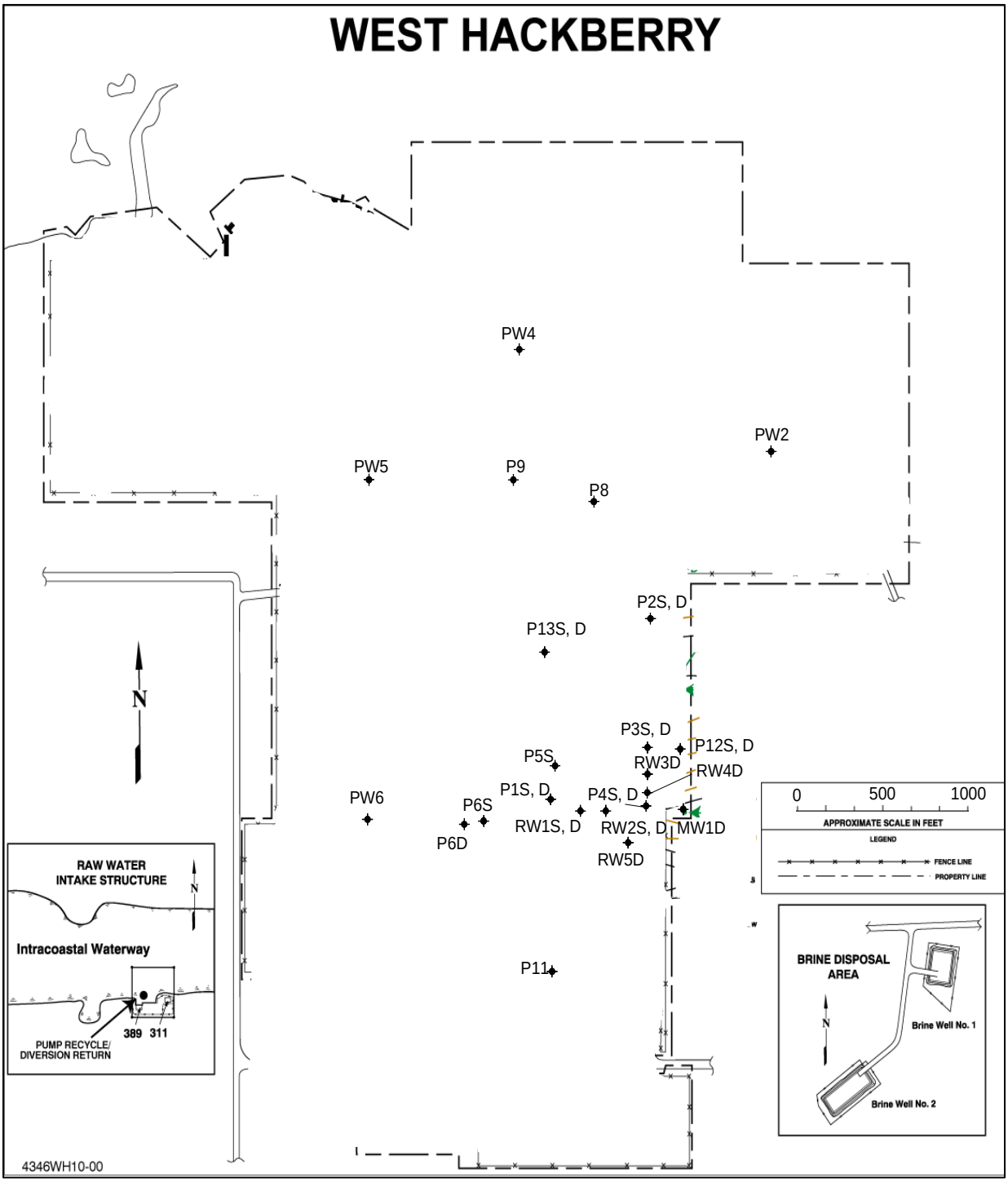


Figure C-11. West Hackberry Ground Water Monitoring Stations, Deep and Shallow

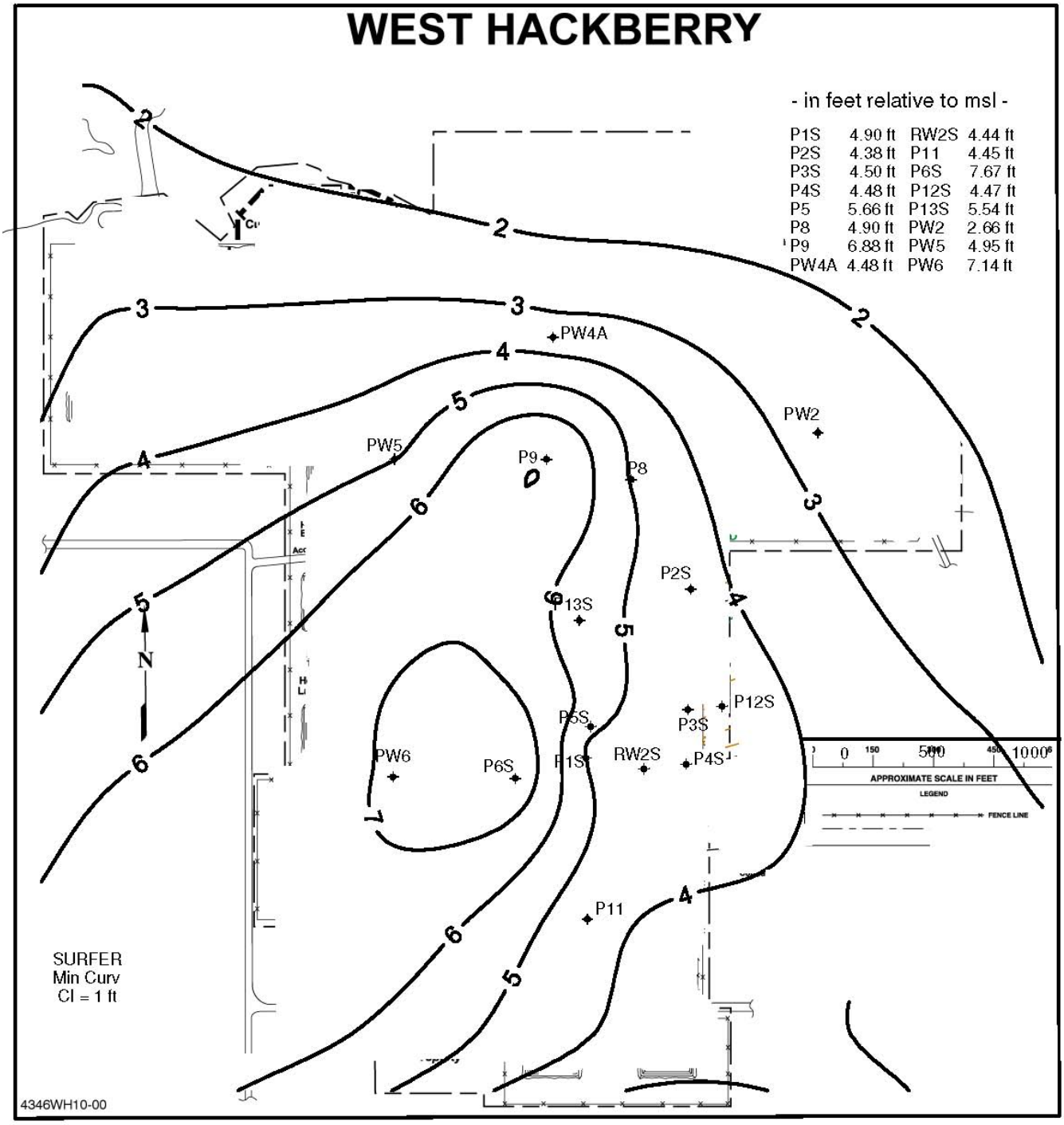


Figure C-12. West Hackberry Shallow Ground Water Zone Contoured Elevations Fall 2012

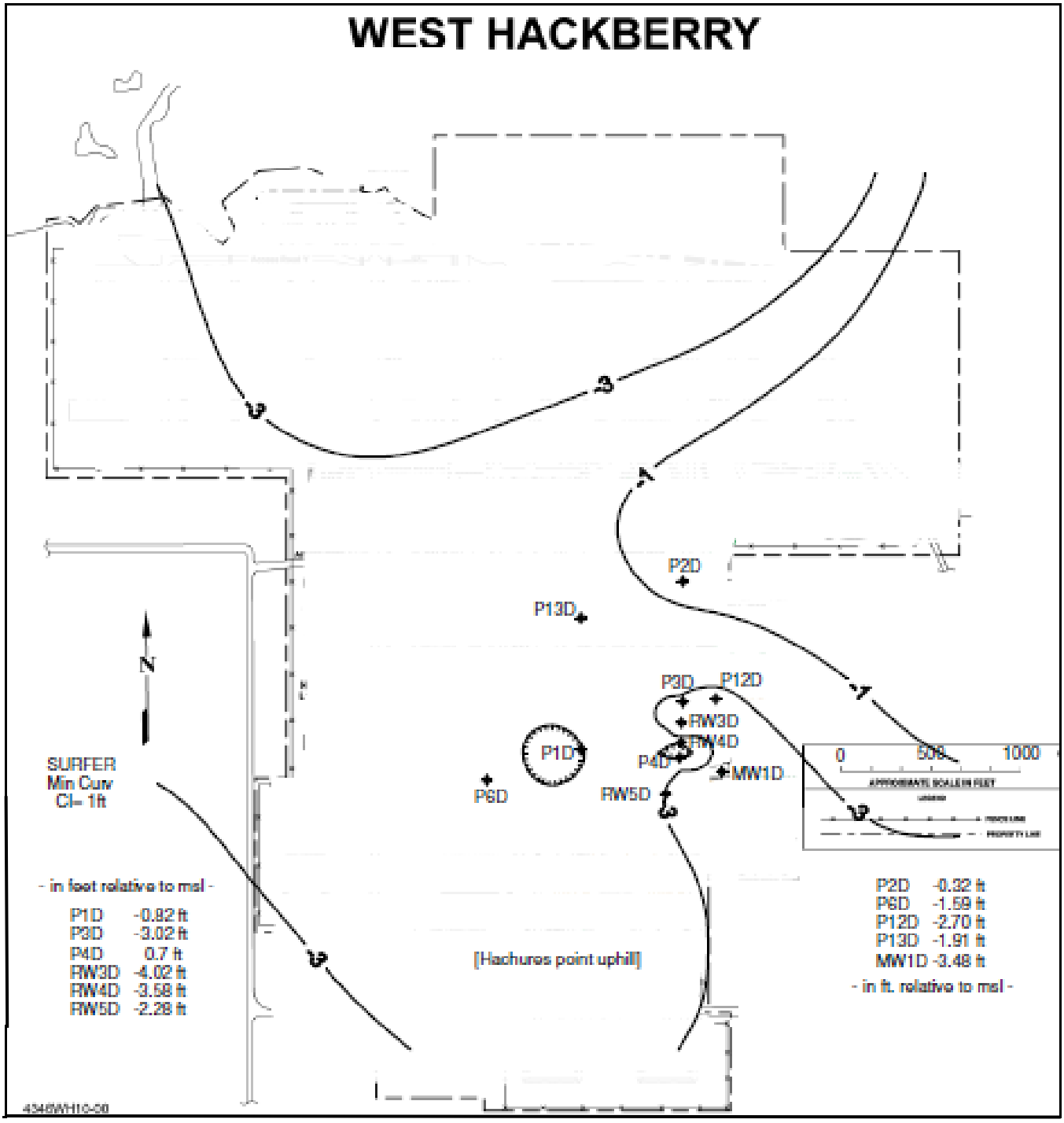


Figure C-13 West Hackberry Deep Ground Water Zone Contoured Elevations Fall 2012

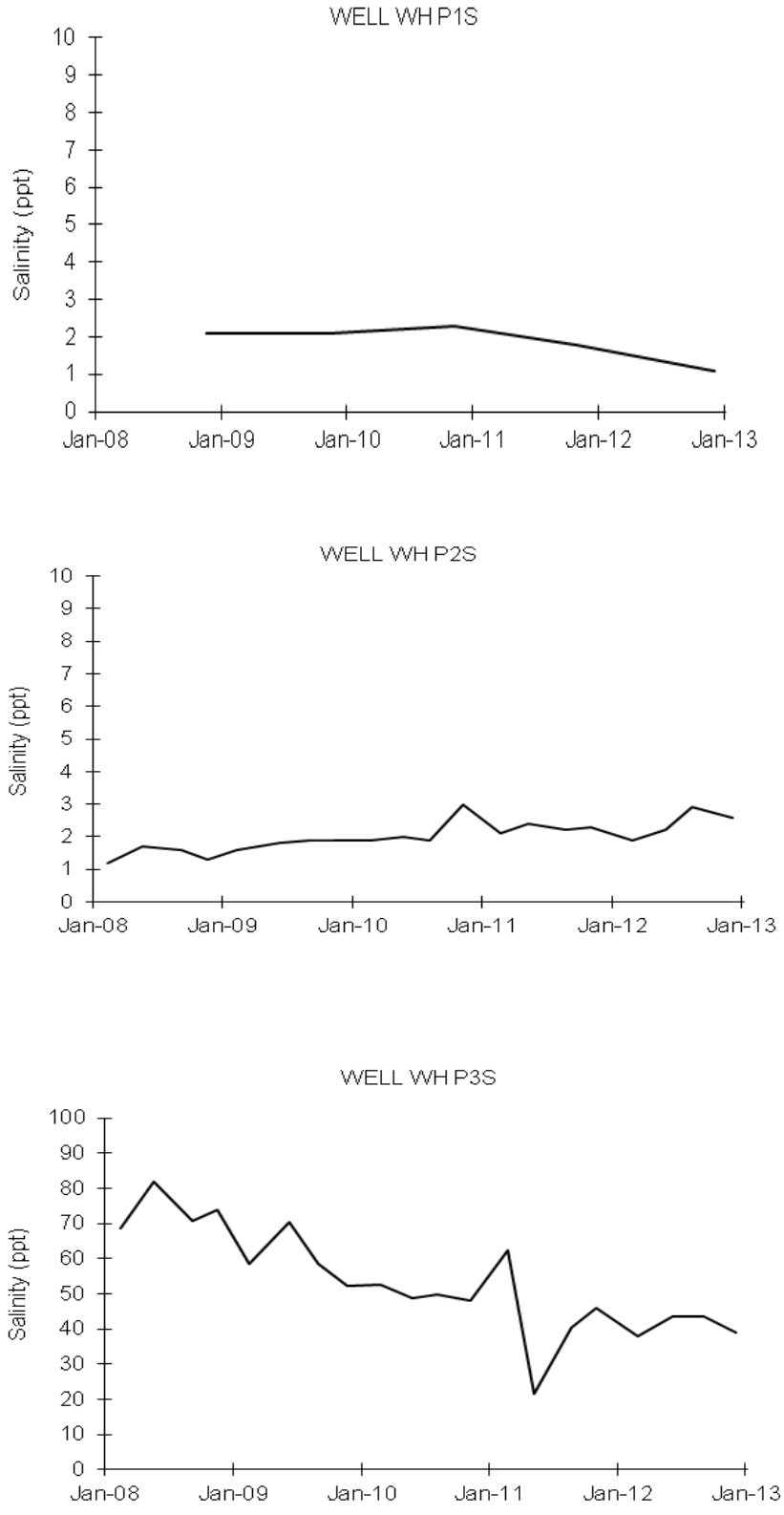


Figure C-14. West Hackberry Ground Water Monitoring Well Salinities

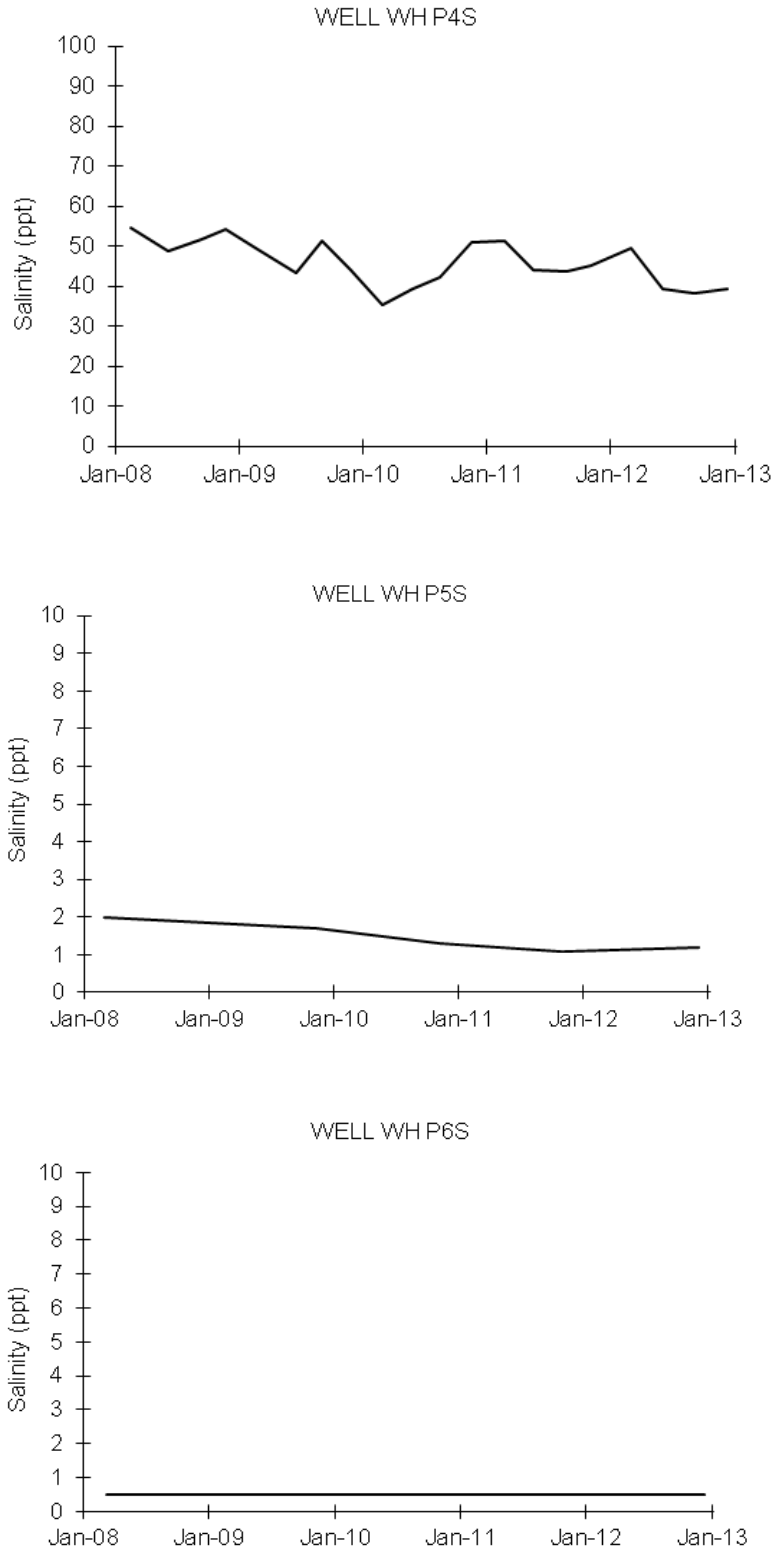


Figure C-14. West Hackberry Ground Water Well Salinities (continued)

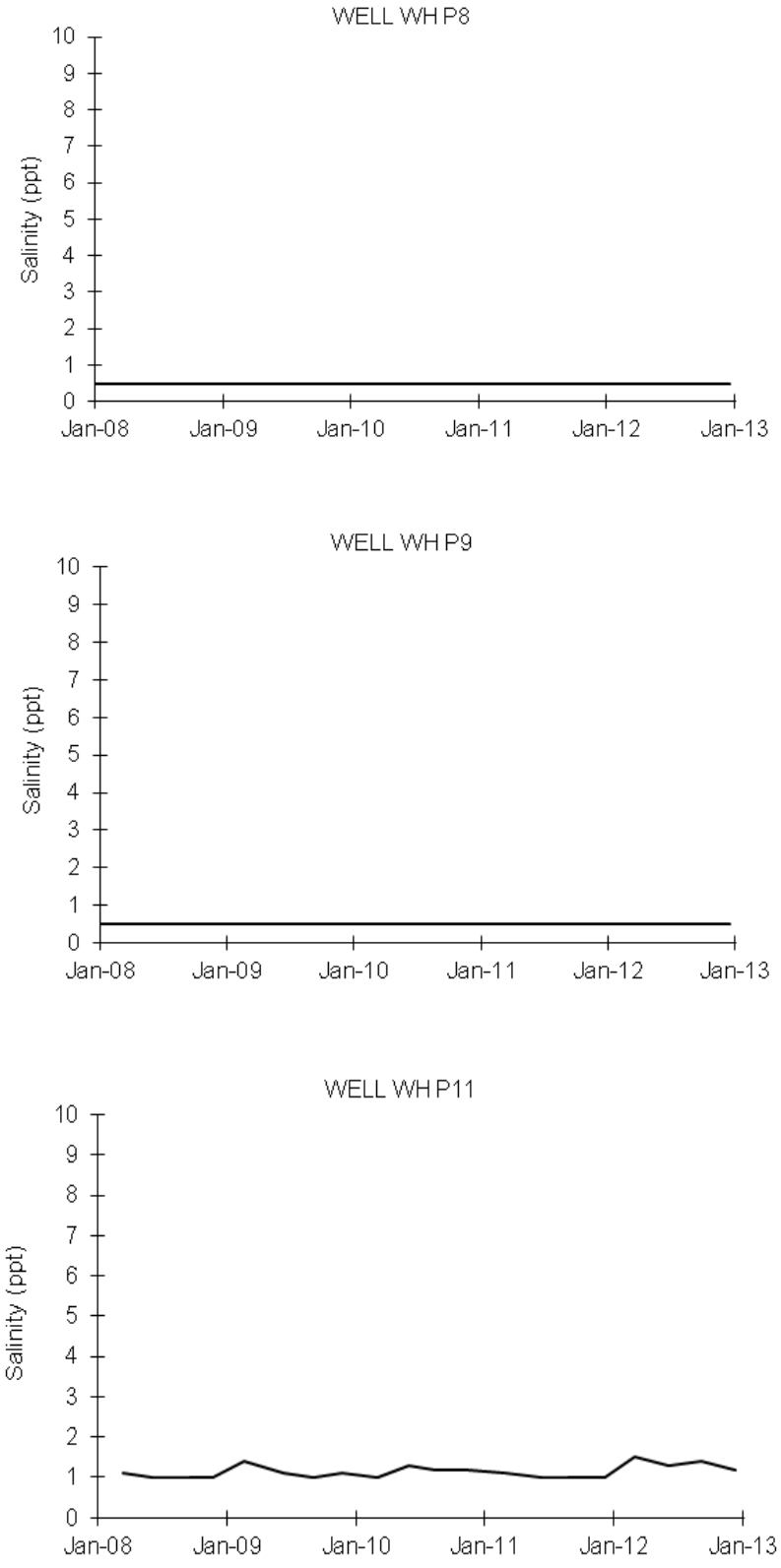
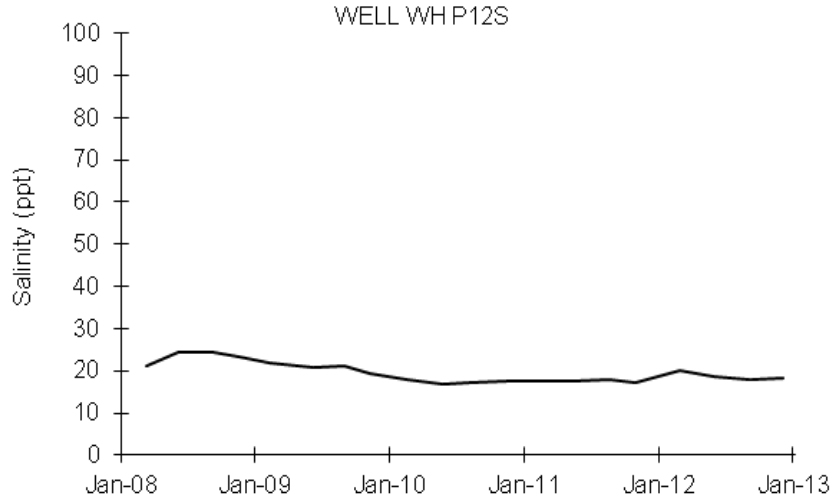
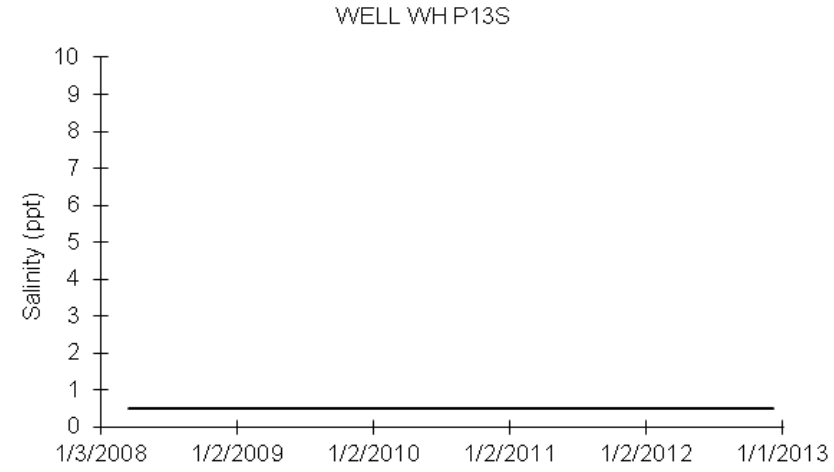


Figure C-14. West Hackberry Ground Water Well Salinities (continued)





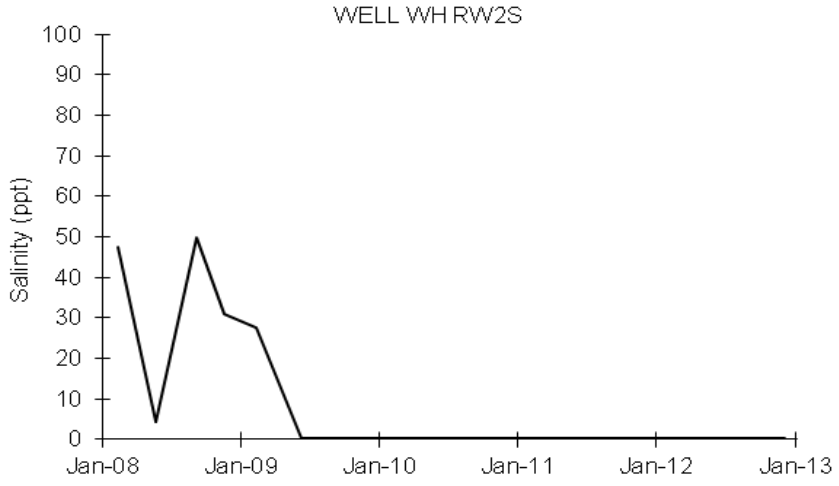


Figure C-14. West Hackberry Ground Water Well Salinities (continued)

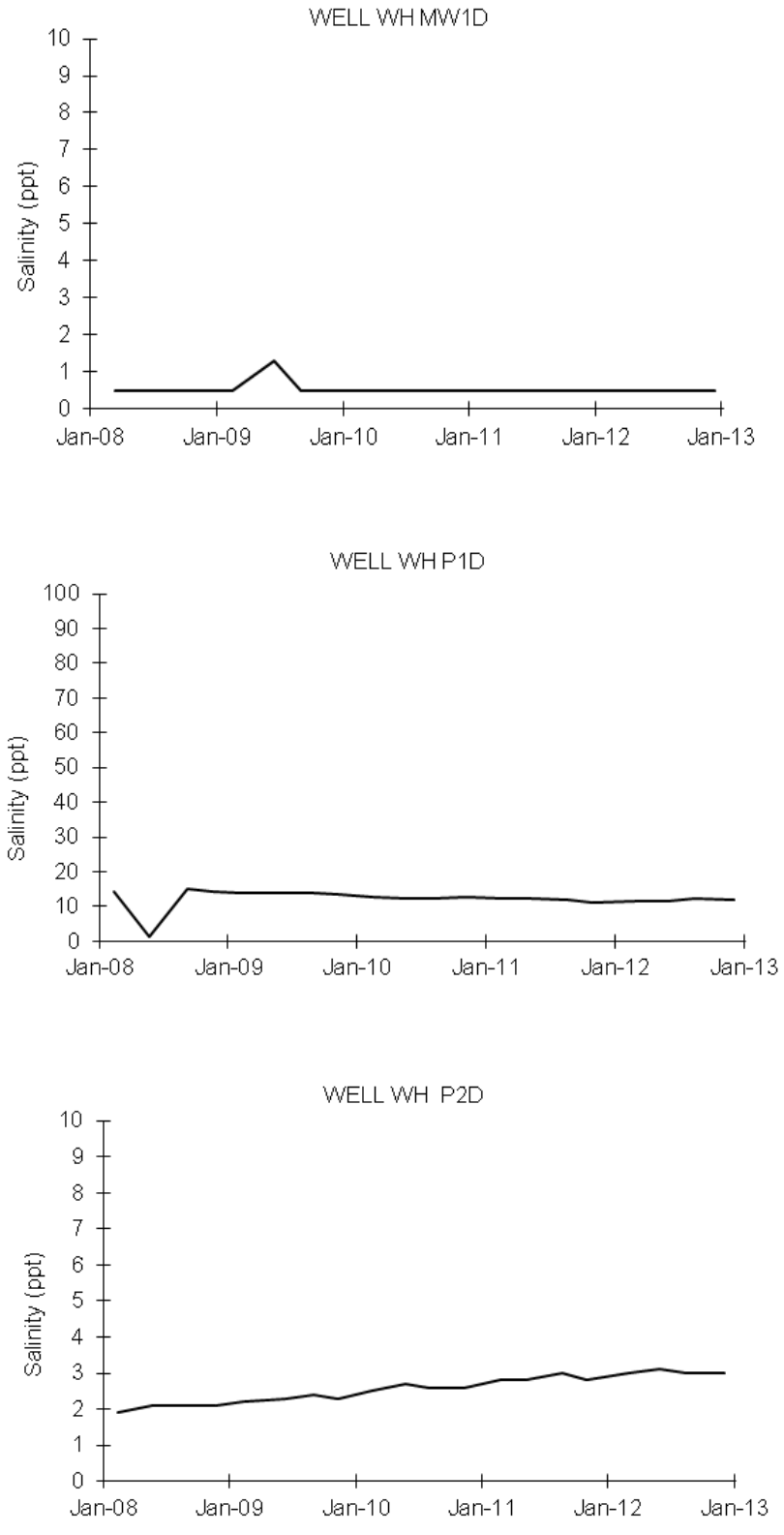
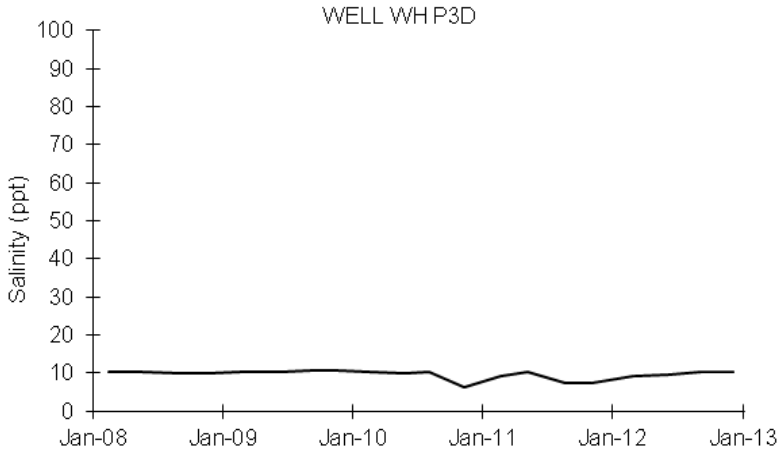
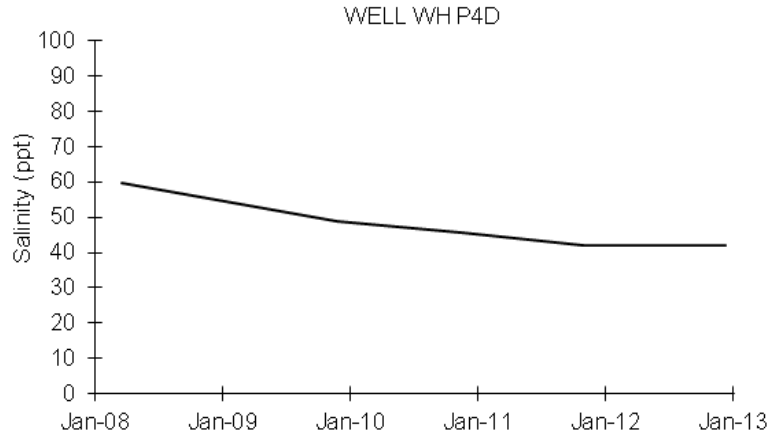


Figure C-14. West Hackberry Ground Water Well Salinities (continued)





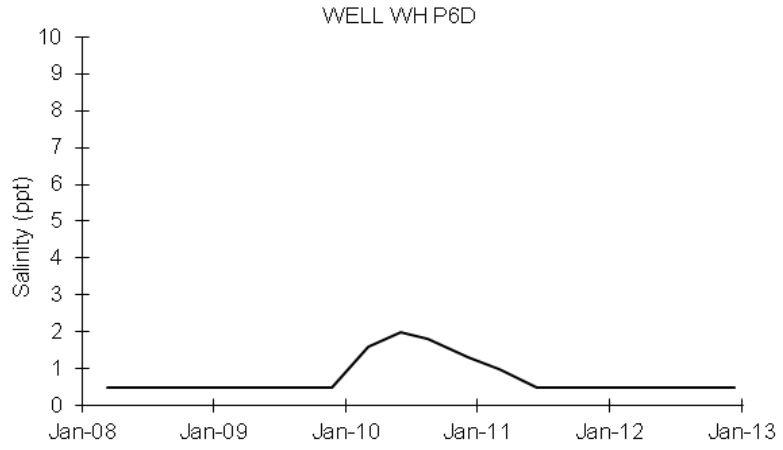


Figure C-14. West Hackberry Ground Water Well Salinities (continued)

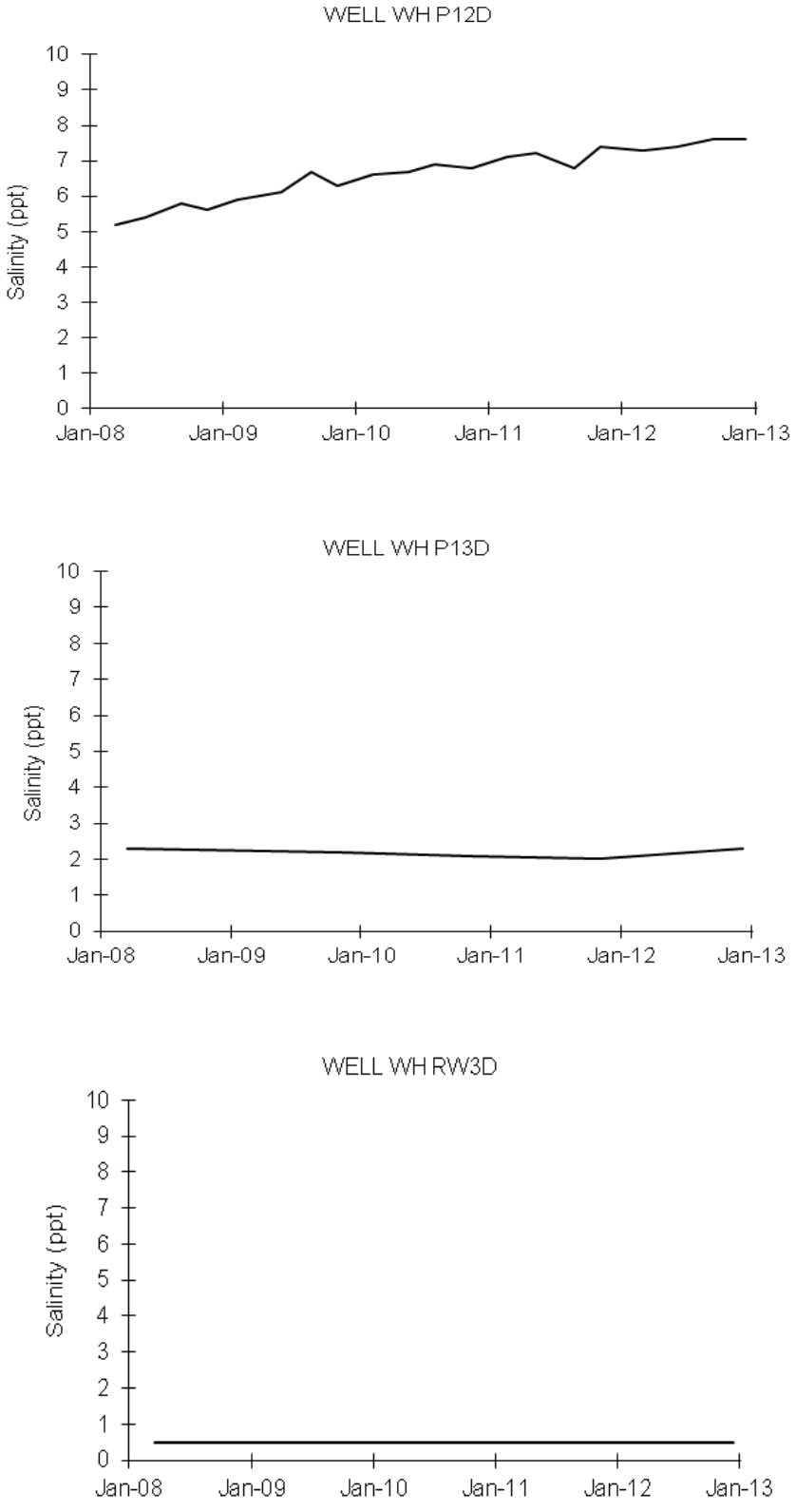


Figure C-14. West Hackberry Ground Water Well Salinities (continued)

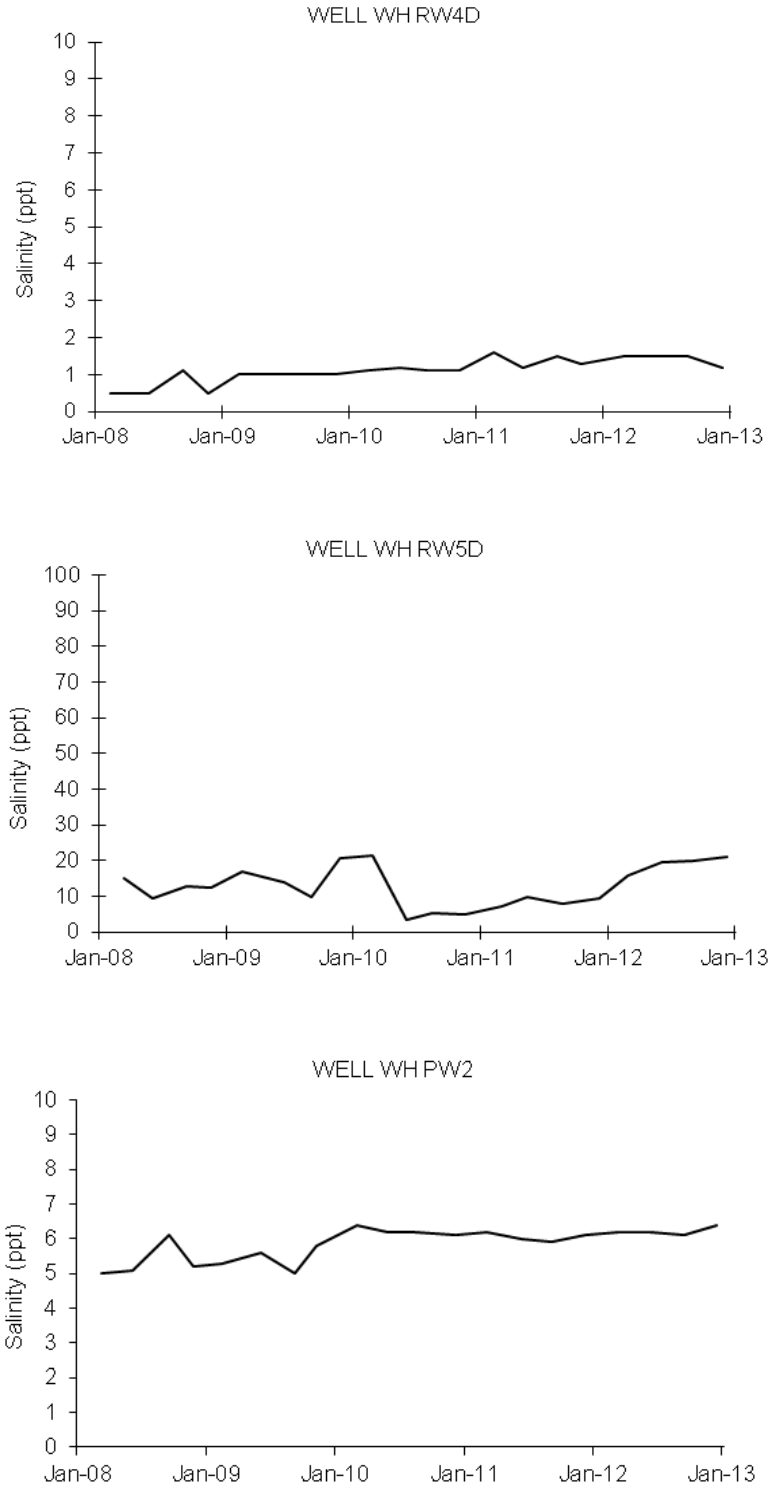
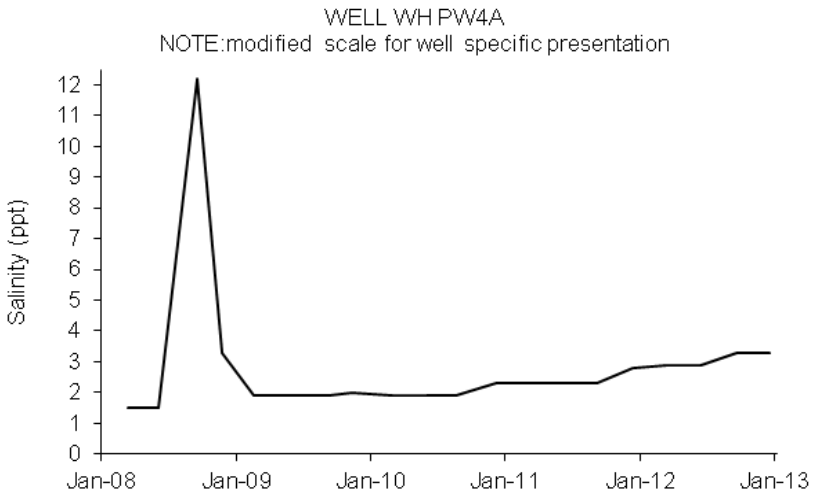
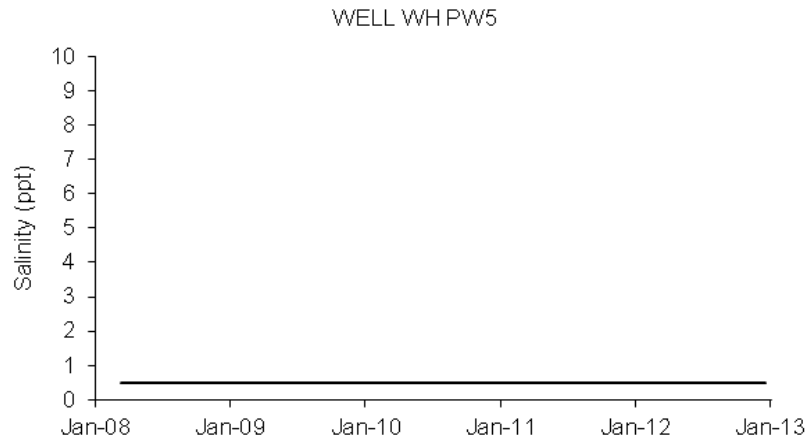


Figure C-14. West Hackberry Ground Water Well Salinities (continued)





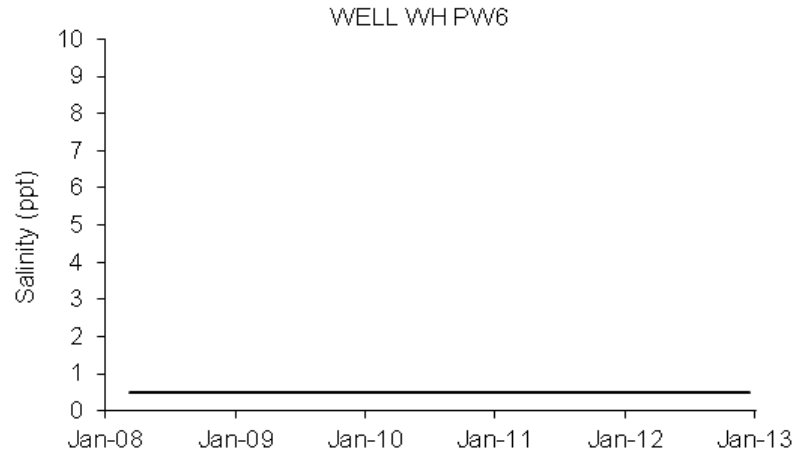


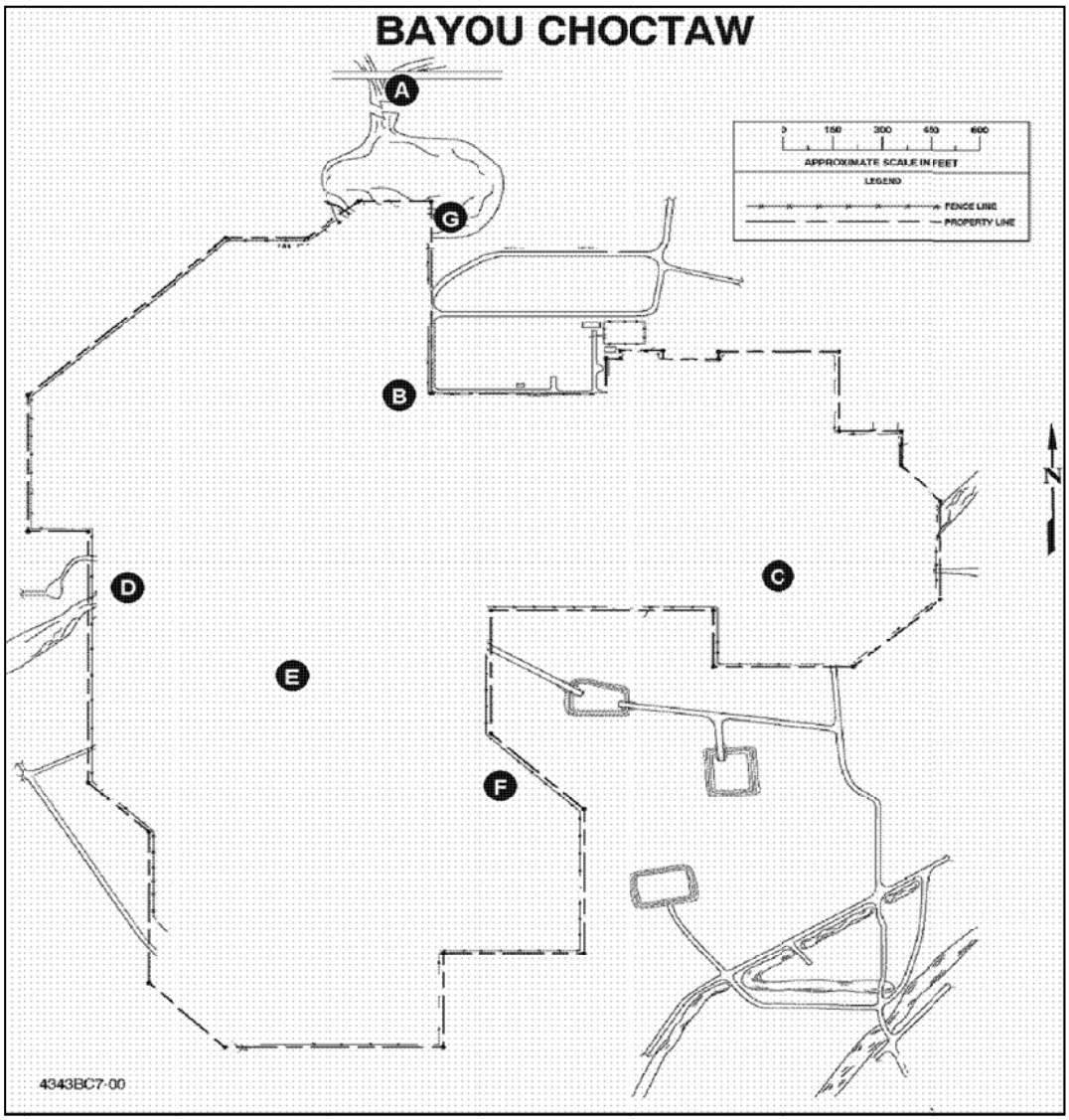
Figure C-14. West Hackberry Ground Water Well Salinities (continued)

End of Appendix

Appendix D

SURFACE WATER QUALITY SURVEILLANCE MONITORING

DURING 2012



Water Quality Monitoring Stations

A Canal north of Cavern Lake at perimeter road bridge
B Ditch running under the road to warehouse on West side of the road in area of heat exchangers.
C East-West Canal at Intersection of road to brine disposal wells
D East-West Canal
E Wetland Area
F Wetland Area
G Near Raw Water Intake

Figure D-1. Bayou Choctaw Environmental Monitoring Stations

Table D-1. 2012 Data Summary for Bayou Choctaw Monitoring Stations

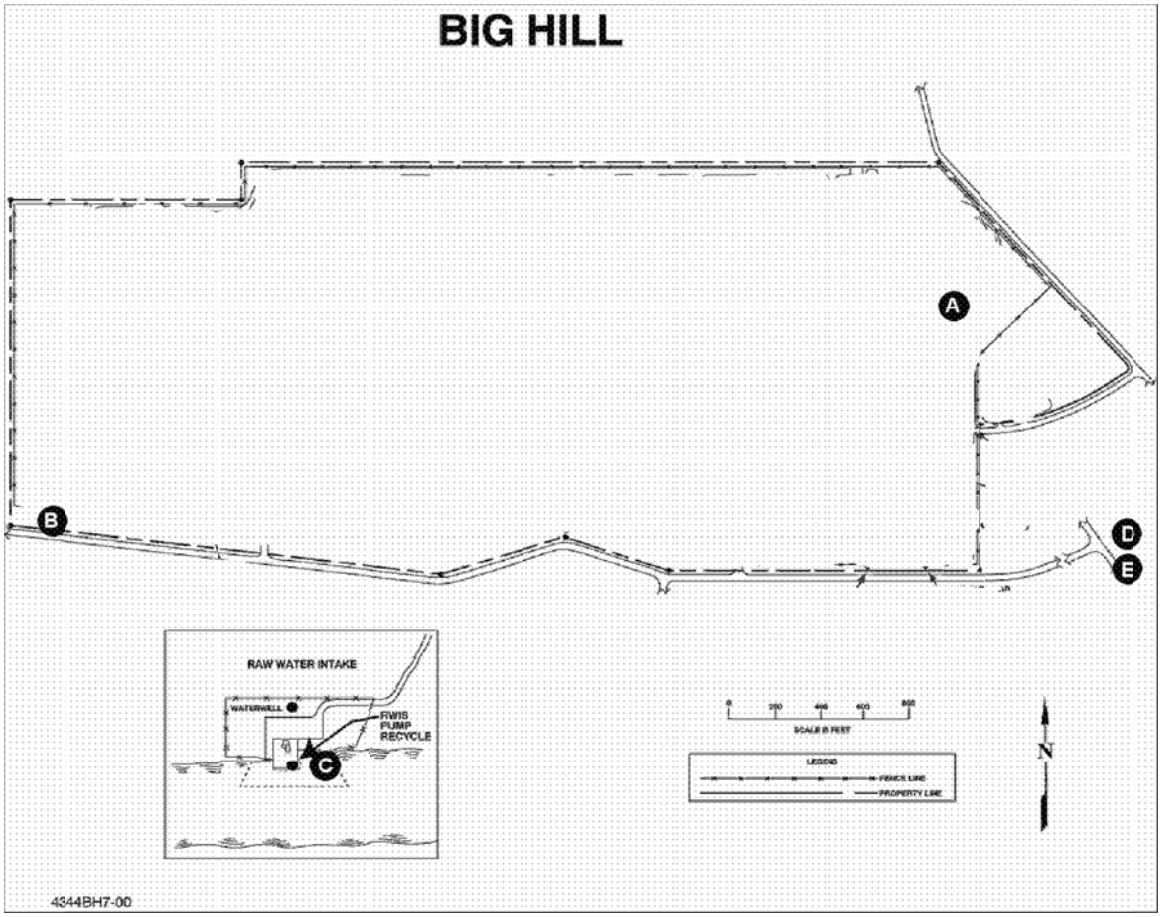
Station	Statistical Parameters	Dissolved Oxygen (mg/L)	Oil & Grease (mg/L)	pH (s.u.)	Salinity (ppt)	Temperature (°C)	Total Organic Carbon (mg/L)
A	Sample Size	8	3	8	8	8	8
	Number of BDL	0	2	NV	8	NV	0
	Maximum	4.7	6.0	7.6	0.5	25.9	15.6
	Minimum	1.0	2.5	7.1	0.5	5.3	2.7
	Mean	2.7	3.7	NV	0.5	16.8	7.7
	Median	2.6	2.5	7.2	0.5	16.6	6.6
	Standard Deviation	1.1	2.0	NV	0.0	6.5	4.8
	Coefficient of Variation	40.8	55.1	NV	0.0	38.9	61.7
B	Sample Size	8	3	8	8	8	8
	Number of BDL	0	2	NV	7	NV	0
	Maximum	6.1	6.0	7.8	2.0	25.9	13.2
	Minimum	1.5	2.5	7.1	0.5	5.6	2.5
	Mean	3.4	3.7	NV	0.7	17.2	6.6
	Median	3.7	2.5	7.3	0.5	16.4	6.3
	Standard Deviation	1.6	2.0	NV	0.5	6.2	3.6
	Coefficient of Variation	46.9	55.1	NV	77.1	35.9	55.3
C	Sample Size	8	3	8	8	8	8
	Number of BDL	0	1	NV	6	NV	0
	Maximum	5.0	7.0	7.6	2.0	26.2	14.6
	Minimum	2.0	2.5	7.0	0.5	6.0	2.6
	Mean	3.4	5.2	NV	0.9	17.2	7.3
	Median	3.7	6.0	7.2	0.5	16.6	7.5
	Standard Deviation	1.1	2.4	NV	0.7	6.3	3.8
	Coefficient of Variation	32.0	45.7	NV	79.4	36.6	51.7
D	Sample Size	8	3	8	8	8	8
	Number of BDL	0	1	NV	7	NV	0
	Maximum	3.9	7.0	7.6	1.0	26.8	16.0
	Minimum	1.7	2.5	7.0	0.5	5.7	2.6
	Mean	3.1	5.2	NV	0.6	17.2	7.6
	Median	3.1	6.0	7.4	0.5	16.6	7.1
	Standard Deviation	0.7	2.4	NV	0.2	6.5	4.5
	Coefficient of Variation	21.4	45.7	NV	31.4	37.6	59.1
E	Sample Size	7	3	7	7	7	7
	Number of BDL	0	1	NV	7	NV	0
	Maximum	5.2	7.0	7.7	0.5	27.3	14.1
	Minimum	0.9	2.5	7.0	0.5	6.0	2.5
	Mean	2.8	5.2	NV	0.5	17.1	7.2
	Median	2.7	6.0	7.2	0.5	16.1	5.7
	Standard Deviation	1.5	2.4	NV	0.0	7.1	4.4
	Coefficient of Variation	54.6	45.7	NV	0.0	41.9	61.8

Note: BDL = Number of samples that were below the detectable limit.
NV = Not a valid number or statistically meaningful.

Table D-1. 2012 Data Summary for Bayou Choctaw Monitoring Stations (continued)

Station	Statistical Parameters	Dissolved Oxygen (mg/L)	Oil & Grease (mg/L)	pH (s.u.)	Salinity (ppt)	Temperature (°C)	Total Organic Carbon (mg/L)
F	Sample Size	8	3	8	8	8	8
	Number of BDL	0	2	NV	6	NV	0
	Maximum	7.1	6.0	7.5	1.0	25.3	15.9
	Minimum	1.6	2.5	7.2	0.5	6.3	2.4
	Mean	3.8	3.7	NV	0.6	16.7	8.0
	Median	3.5	2.5	7.3	0.5	16.3	8.3
	Standard Deviation	1.8	2.0	NV	0.2	6.2	4.7
	Coefficient of Variation	47.7	55.1	NV	31.4	36.8	58.8
G	Sample Size	8	3	8	8	8	8
	Number of BDL	0	2	NV	8	NV	0
	Maximum	6.1	6.0	7.7	0.5	25.3	16.0
	Minimum	1.4	2.5	7.1	0.5	8.9	3.4
	Mean	4.1	3.7	NV	0.5	17.1	8.9
	Median	4.3	2.5	7.4	0.5	16.3	9.1
	Standard Deviation	1.4	2.0	NV	0.0	5.6	3.8
	Coefficient of Variation	34.0	55.1	NV	0.0	32.7	42.5

Note: BDL = Number of samples that were below the detectable limit.
NV = Not a valid number or statistically meaningful.



Water Quality Monitoring Stations

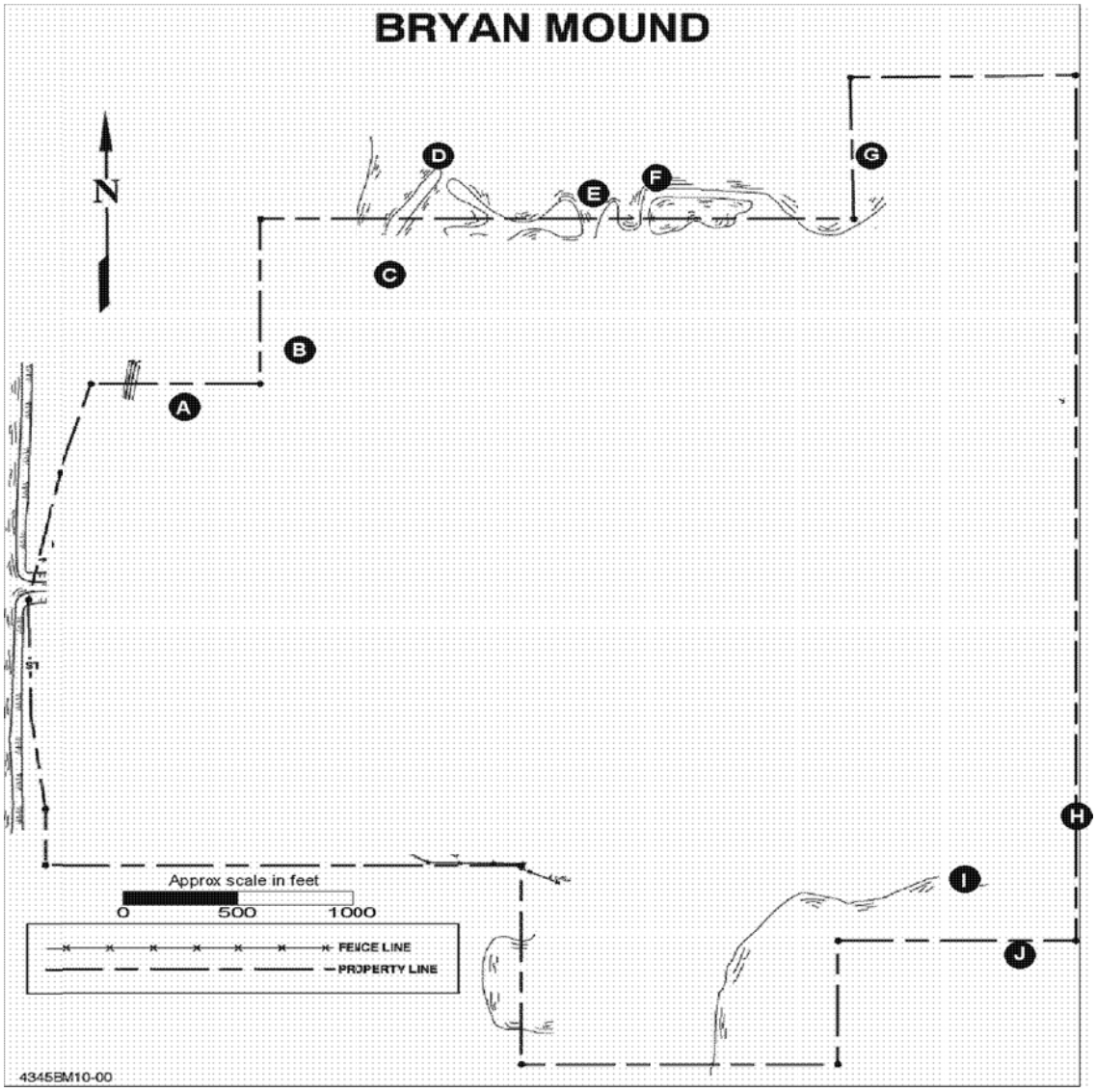
A Pond receiving effluent from site sewage treatment plant (STP)
B Wilbur Road ditch – southwest of site
C RWIS at Intracoastal Waterway
D Pipkin Reservoir – (1.8 Miles from map location)
E Gator Hole – (3.1 Miles from map location)

Figure D-2. Big Hill Environmental Monitoring Stations

Table D-2. 2012 Data Summary for Big Hill Monitoring Stations

Station	Statistical Parameters	Dissolved Oxygen (mg/L)	Oil & Grease (mg/L)	pH (s.u.)	Salinity (ppt)	Temperature (°C)	Total Organic Carbon (mg/L)
A	Sample Size	3	3	8	8	8	8
	Number of BDL	0	3	NV	8	NV	0
	Maximum	6.2	2.5	8.0	0.5	32.0	28.2
	Minimum	2.5	2.5	6.8	0.5	15.0	18.0
	Mean	4.0	2.5	NV	0.5	24.5	22.5
	Median	3.5	2.5	7.1	0.5	26.5	23.0
	Standard Deviation	1.9	0.0	NV	0.0	5.9	3.3
	Coefficient of Variation	47.9	0.0	NV	0.0	24.2	14.6
B	Sample Size	6	4	12	12	12	12
	Number of BDL	0	4	NV	7	NV	0
	Maximum	8.7	2.5	8.3	1.6	30.0	27.0
	Minimum	2.7	2.5	6.9	0.5	11.0	7.2
	Mean	5.1	2.5	NV	0.8	21.5	15.2
	Median	4.1	2.5	7.4	0.5	22.0	14.8
	Standard Deviation	2.5	0.0	NV	0.4	7.4	5.7
	Coefficient of Variation	48.6	0.0	NV	51.0	34.2	37.5
C	Sample Size	6	4	12	12	12	12
	Number of BDL	0	3	NV	0	NV	0
	Maximum	7.5	9.3	8.0	22.0	31.0	27.7
	Minimum	5.4	2.5	7.1	1.4	15.0	5.4
	Mean	6.0	4.2	NV	13.3	23.3	11.3
	Median	5.7	2.5	7.5	15.5	23.0	9.0
	Standard Deviation	0.8	3.4	NV	7.2	6.2	6.3
	Coefficient of Variation	13.7	81.0	NV	53.8	26.6	55.6
D	Sample Size	6	4	11	11	11	11
	Number of BDL	0	4	NV	0	NV	0
	Maximum	11.0	2.5	7.9	3.5	31.0	35.0
	Minimum	1.9	2.5	6.9	1.2	12.0	11.9
	Mean	5.2	2.5	NV	2.2	21.5	24.7
	Median	5.0	2.5	7.5	2.1	19.0	24.1
	Standard Deviation	3.1	0.0	NV	0.6	7.0	5.9
	Coefficient of Variation	59.9	0.0	NV	28.1	32.4	23.8
E	Sample Size	6	4	12	12	12	12
	Number of BDL	0	3	NV	0	NV	0
	Maximum	5.2	6.9	8.0	7.3	32.0	44.7
	Minimum	3.2	2.5	6.6	1.5	11.0	11.2
	Mean	4.4	3.6	NV	3.6	22.0	24.8
	Median	4.4	2.5	7.2	3.1	23.0	24.1
	Standard Deviation	0.6	2.2	NV	2.0	7.4	8.9
	Coefficient of Variation	14.5	61.1	NV	56.4	33.5	36.1

Note: BDL = Number of samples that were below the detectable limit.
NV = Not a valid number or statistically meaningful.



Water Quality Monitoring Stations

A Blue Lake
B Blue Lake
C Blue Lake
D Blue Lake – Control Point 1
E Blue Lake
F Blue Lake
G Blue Lake
H Mud Lake
I Mud Lake
J Mud Lake – Control Point 2

Figure D-3. Bryan Mound Environmental Monitoring Stations

Table D-3. 2012 Data Summary for Bryan Mound Monitoring Stations

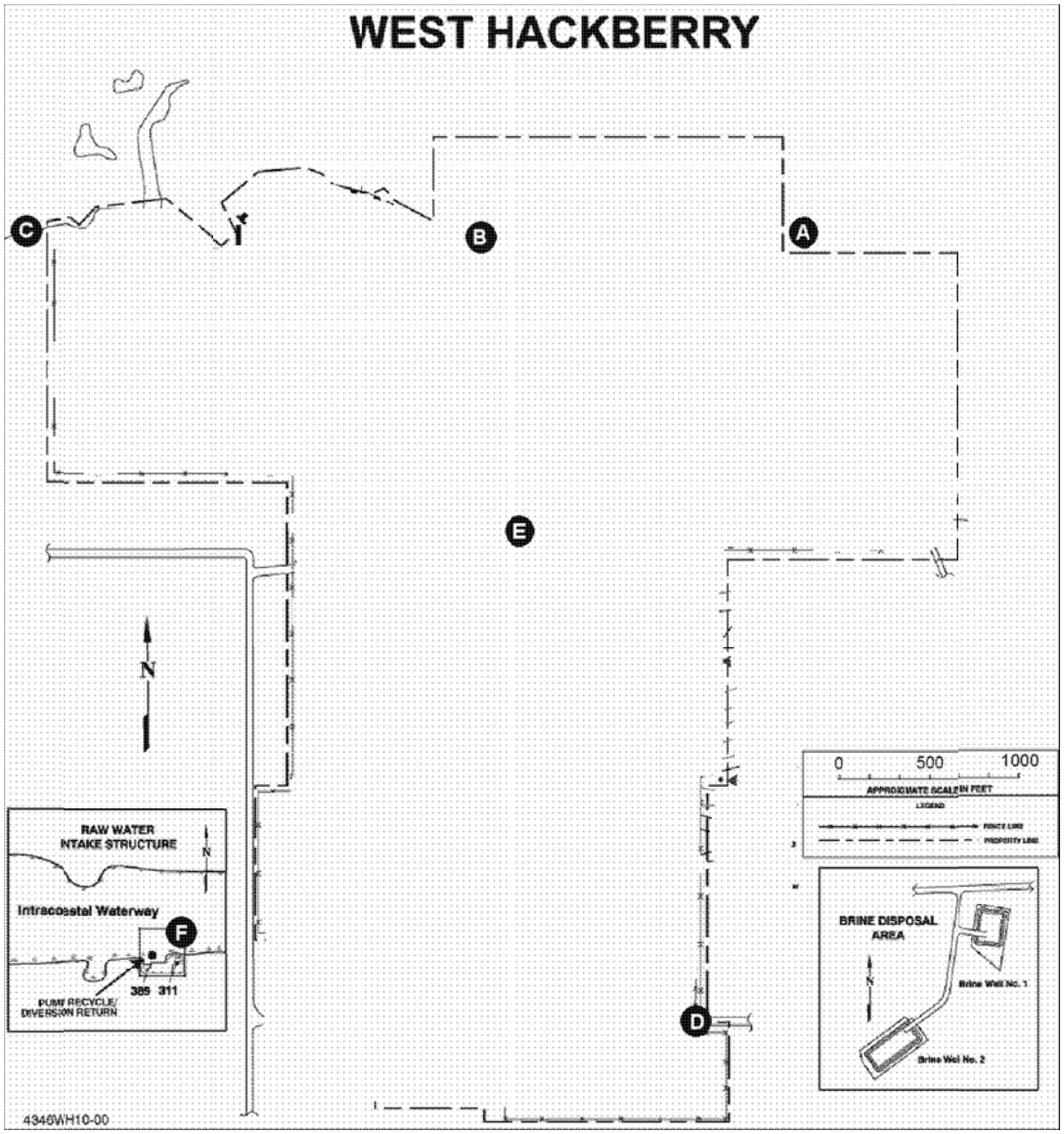
Station	Statistical Parameters	Dissolved Oxygen (mg/L)	Oil & Grease (mg/L)	pH (s.u.)	Salinity (ppt)	Temperature (°C)	Total Organic Carbon (mg/L)
A	Sample Size	8	4	9	9	9	9
	Number of BDL	0	4	NV	0	NV	0
	Maximum	16.9	2.5	8.2	6.0	31.8	38.5
	Minimum	1.1	2.5	6.3	4.7	18.2	14.8
	Mean	9.0	2.5	NV	5.4	26.8	27.5
	Median	8.7	2.5	7.1	5.2	27.9	28.4
	Standard Deviation	7.0	0.0	NV	0.4	4.5	6.4
	Coefficient of Variation	78.3	0.0	NV	8.4	16.8	23.4
B	Sample Size	8	4	9	8	9	9
	Number of BDL	0	4	NV	0	NV	0
	Maximum	20.0	2.5	8.2	5.9	32.2	34.8
	Minimum	1.5	2.5	6.5	4.8	18.5	17.0
	Mean	10.8	2.5	NV	5.4	26.8	27.3
	Median	11.8	2.5	7.2	5.4	27.9	27.3
	Standard Deviation	8.5	0.0	NV	0.4	4.5	4.8
	Coefficient of Variation	78.2	0.0	NV	6.8	16.9	17.5
C	Sample Size	8	4	9	9	9	9
	Number of BDL	0	4	NV	0	NV	0
	Maximum	19.9	2.5	8.4	5.9	32.2	32.5
	Minimum	1.5	2.5	6.4	4.8	18.5	17.0
	Mean	10.6	2.5	NV	5.5	26.9	26.9
	Median	11.9	2.5	7.2	5.4	27.8	27.3
	Standard Deviation	8.1	0.0	NV	0.4	4.6	4.4
	Coefficient of Variation	75.9	0.0	NV	6.7	17.1	16.5
D	Sample Size	8	4	9	9	9	9
	Number of BDL	0	4	NV	0	NV	0
	Maximum	19.7	2.5	8.2	6.1	31.9	29.5
	Minimum	1.3	2.5	6.6	4.7	18.1	15.7
	Mean	10.4	2.5	NV	5.5	27.1	25.1
	Median	11.0	2.5	7.2	5.4	27.9	25.9
	Standard Deviation	8.2	0.0	NV	0.4	4.5	4.1
	Coefficient of Variation	79.0	0.0	NV	7.2	16.8	16.3
E	Sample Size	8	4	9	9	9	9
	Number of BDL	0	4	NV	0	NV	0
	Maximum	19.9	2.5	8.2	6.1	32.3	29.3
	Minimum	1.5	2.5	6.9	4.7	18.3	17.4
	Mean	10.8	2.5	NV	5.4	27.0	25.1
	Median	12.1	2.5	7.1	5.3	27.8	26.3
	Standard Deviation	8.0	0.0	NV	0.4	4.5	3.6
	Coefficient of Variation	73.8	0.0	NV	7.7	16.7	14.4

Note: BDL = Number of samples that were below the detectable limit.
NV = Not a valid number or statistically meaningful.

Table D-3. 2012 Data Summary for Bryan Mound Monitoring Stations (continued)

Station	Statistical Parameters	Dissolved Oxygen (mg/L)	Oil & Grease (mg/L)	pH (s.u.)	Salinity (ppt)	Temperature (°C)	Total Organic Carbon (mg/L)
F	Sample Size	8	4	9	9	9	9
	Number of BDL	0	4	NV	0	NV	0
	Maximum	19.7	2.5	8.3	6.1	32.3	28.6
	Minimum	1.5	2.5	6.6	4.7	18.4	16.3
	Mean	10.6	2.5	NV	5.4	27.1	24.9
	Median	11.7	2.5	7.2	5.4	27.8	25.7
	Standard Deviation	8.2	0.0	NV	0.4	4.6	3.8
	Coefficient of Variation	77.9	0.0	NV	7.4	16.8	15.1
G	Sample Size	8	4	9	9	9	9
	Number of BDL	0	4	NV	0	NV	0
	Maximum	20.0	2.5	8.4	6.1	32.4	28.9
	Minimum	1.5	2.5	7.0	4.8	18.2	16.4
	Mean	10.6	2.5	NV	5.5	27.2	24.5
	Median	12.0	2.5	7.2	5.5	28.2	25.1
	Standard Deviation	8.1	0.0	NV	0.4	4.7	3.8
	Coefficient of Variation	75.9	0.0	NV	6.9	17.2	15.5
H	Sample Size	9	4	9	9	9	9
	Number of BDL	0	4	NV	0	NV	0
	Maximum	11.4	2.5	7.9	30.9	32.1	20.7
	Minimum	1.0	2.5	6.6	3.7	17.1	8.6
	Mean	6.3	2.5	NV	21.8	27.2	14.9
	Median	5.3	2.5	7.1	26.1	28.6	16.5
	Standard Deviation	4.5	0.0	NV	9.4	4.7	4.4
	Coefficient of Variation	71.7	0.0	NV	43.4	17.3	29.6
I	Sample Size	8	4	8	8	8	8
	Number of BDL	0	4	NV	0	NV	0
	Maximum	12.9	2.5	7.9	30.9	32.1	20.2
	Minimum	1.7	2.5	6.7	3.8	17.2	9.4
	Mean	6.1	2.5	NV	21.9	26.8	14.7
	Median	4.1	2.5	7.3	26.8	27.1	15.3
	Standard Deviation	4.8	0.0	NV	10.1	5.0	4.1
	Coefficient of Variation	78.2	0.0	NV	46.0	18.7	27.8
J	Sample Size	9	4	9	9	9	9
	Number of BDL	0	4	NV	0	NV	0
	Maximum	14.7	2.5	7.9	31.0	32.2	18.9
	Minimum	1.9	2.5	6.5	3.8	17.1	8.2
	Mean	6.3	2.5	NV	21.8	27.1	13.5
	Median	5.2	2.5	7.3	26.1	28.3	14.2
	Standard Deviation	4.6	0.0	NV	9.3	4.9	4.0
	Coefficient of Variation	73.8	0.0	NV	42.8	18.0	29.6

Note: BDL = Number of samples that were below the detectable limit.
NV = Not a valid number or statistically meaningful.



Water Quality Monitoring Stations

A Black Lake
B Black Lake
C Black Lake
D Southeast drainage ditch
E High-pressure pump pad
F Raw water intake structure (Intracoastal Waterway)

Figure D-4. West Hackberry Environmental Monitoring Stations

Table D-4. 2012 Data Summary for West Hackberry Monitoring Stations

Station	Statistical Parameters	Dissolved Oxygen (mg/L)	Oil & Grease (mg/L)	pH (s.u.)	Salinity (ppt)	Temperature (°C)	Total Organic Carbon (mg/L)
A	Sample Size	12	4	12	12	12	12
	Number of BDL	0	4	NV	0	NV	0
	Maximum	9.8	2.5	8.0	21.7	32.0	11.0
	Minimum	5.5	2.5	5.2	5.3	15.0	5.5
	Mean	7.4	2.5	NV	12.8	23.6	8.4
	Median	7.5	2.5	7.5	13.2	24.0	8.6
	Standard Deviation	1.5	0.0	NV	5.1	6.3	1.5
	Coefficient of Variation	20.0	0.0	NV	40.1	26.6	18.4
B	Sample Size	12	4	12	12	12	12
	Number of BDL	0	4	NV	0	NV	0
	Maximum	9.6	2.5	7.8	20.8	32.0	11.2
	Minimum	5.3	2.5	5.2	4.9	15.0	6.2
	Mean	7.3	2.5	NV	12.5	23.7	8.6
	Median	7.3	2.5	7.5	13.1	24.5	8.6
	Standard Deviation	1.5	0.0	NV	4.9	6.0	1.6
	Coefficient of Variation	20.1	0.0	NV	39.3	25.2	18.3
C	Sample Size	12	4	12	12	12	12
	Number of BDL	0	4	NV	0	NV	0
	Maximum	9.7	2.5	7.8	18.3	32.0	10.3
	Minimum	5.7	2.5	5.2	5.9	15.0	6.2
	Mean	7.3	2.5	NV	12.4	23.7	8.5
	Median	6.8	2.5	7.5	13.0	24.5	8.6
	Standard Deviation	1.5	0.0	NV	4.4	6.1	1.4
	Coefficient of Variation	20.5	0.0	NV	35.3	25.8	16.2
D	Sample Size	12	4	12	12	12	12
	Number of BDL	0	4	NV	12	NV	0
	Maximum	14.8	2.5	9.7	0.5	32.0	17.6
	Minimum	5.3	2.5	7.4	0.5	13.0	4.2
	Mean	9.8	2.5	NV	0.5	23.1	9.1
	Median	10.1	2.5	7.7	0.5	23.0	8.0
	Standard Deviation	2.7	0.0	NV	0.0	6.1	4.7
	Coefficient of Variation	27.5	0.0	NV	0.0	26.5	52.2

Note: BDL = Number of samples that were below the detectable limit.
NV = Not a valid number or statistically meaningful.

Table D-4. 2012 Data Summary for West Hackberry Monitoring Stations (continued)

Station	Statistical Parameters	Dissolved Oxygen (mg/L)	Oil & Grease (mg/L)	pH (s.u.)	Salinity (ppt)	Temperature (°C)	Total Organic Carbon (mg/L)
E	Sample Size	12	4	12	12	12	12
	Number of BDL	0	4	NV	12	NV	0
	Maximum	10.0	2.5	8.3	0.5	31.0	7.4
	Minimum	4.3	2.5	7.3	0.5	14.0	2.6
	Mean	7.0	2.5	NV	0.5	23.1	4.3
	Median	7.2	2.5	7.6	0.5	23.5	3.6
	Standard Deviation	1.5	0.0	NV	0.0	5.8	1.6
	Coefficient of Variation	21.0	0.0	NV	0.0	25.3	37.3
F	Sample Size	12	4	12	12	12	12
	Number of BDL	0	4	NV	1	NV	0
	Maximum	9.3	2.5	7.8	20.7	32.0	12.6
	Minimum	4.6	2.5	6.5	0.5	16.0	5.9
	Mean	6.7	2.5	NV	8.9	23.8	8.7
	Median	6.2	2.5	7.2	7.2	23.5	8.6
	Standard Deviation	1.5	0.0	NV	7.0	6.0	2.4
	Coefficient of Variation	23.0	0.0	NV	79.2	25.1	27.3

Note: BDL = Number of samples that were below the detectable limit.
NV = Not a valid number or statistically meaningful.

End of Appendix