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2 September 2014

Mr. Dwight C. Russell, P.E.
MC-124
Texas Commission on Environmental Quality
MSW Permits Section, Waste Permits Division
P.O. Box 13087
Austin, Texas 78711-3087

Subject: Response to Second Notice of Deficiency (NOD)
Permit Modification – Oil and Gas Waste Processing
Covel Gardens Landfill, MSW Permit No. 2093B
San Antonio, Bexar County, Texas
Tracking Nos. 18053589 and 18358472; RN100218338/CN600127856

Dear Mr. Russell:

On behalf of Waste Management of Texas, Inc. (WMTX), Geosyntec Consultants (Geosyntec) has prepared this letter in response to the notice of deficiency (NOD) comments on the above-referenced permit modification request transmitted in a 31 July 2014 letter from the Texas Commission on Environmental Quality (TCEQ) to Waste Management of Texas, Inc. (WMTX).

RESPONSE TO COMMENTS

TCEQ's comments are presented below in italicized type, with responses immediately following the comments in regular type. Additionally, the resulting replacement pages to the permit modification application are enclosed with this letter to replace the previously submitted versions of the applicable pages. These revisions have an updated date reflecting the revision. A working copy is also attached to this submittal that uses an underline/strikethrough format, in order to mark the revised text, to highlight the revision and facilitate TCEQ's review.

Comment 1: *In Comment No. 1 of our previous letter, we requested that the table of updated cost estimates be checked for potentially inconsistent dates and any necessary revisions performed. The response was that the inconsistent dates were corrected. In review of the corrected table, it appears that the updated cost for the oil and gas waste processing facility was revised such that the value in the right column now differs from the value in the left column. This revision was not made in redline/strikeout and no explanation for this revision appears to have been provided. Please explain why the cost was revised and why the two costs differ. In the future, please ensure that all proposed revisions to the approved application are clearly indicated and discussed, as required by 30 TAC § 305.70(e)*

Response to Comment 1: The reason for the proposed cost revision was noted in the last bullet on Page 5

of the response to NOD 1 letter. As stated, "*The addition of the frac tanks and the modified pit (basin) dimensions resulted in changes to the waste volumes used to calculate the closure cost of the facility. Therefore, the facility combined closure and post closure cost estimate, Section 4 of Attachment 8, has been updated…*". Because the table is an embedded image of a Microsoft Excel-based table placed within the plan document, the individual table edits were not able to appear as redline/strikethrough or otherwise be highlighted, and instead, the table was completely replaced. The Microsoft Excel track changes function does not have the capability of showing changes in redline/strikethrough format. Unfortunately in the previous submittal the closure amount for oil and gas waste processing facility in the left column was inadvertently not updated to match the right column. The intended value should have been $119,277 in both columns. We apologize for the confusion. With this response, we have corrected this error, and have also revised the table of combined facility closure costs as requested below in Comment 2. Since the Microsoft Excel track changes function does not have the capability of showing changes in redline/strikethrough format, instead we have highlighted the cells that contain revisions.

Comment 2: *The table of updated cost estimates combines the landfill closure and post-closure cost estimates prior to applying the inflation factors. The table should be revised to note the closure cost and post-closure cost for the landfill separately so that the updated cost estimates for the facility's closure and post-closure can be distinguished.*

Response to Comment 2: For reference, note that the table has been accepted in its previous format for several previous permit modifications with the landfill closure and post-closure costs combined into one line item; and this item does not pertain to the permit modification being made at this time. Nevertheless, the table of combined closure costs on Page 8-9 of Attachment 8 has been revised as requested. This was done by inserting the landfill closure and post-closure cost totals from Tables 8-1 and 8-2 (2004 dollars) as separate line items in the combined cost estimate, and then inflating them accordingly. We also revised the table in response to Comment 1, and the total dollar amount changed very slightly when correcting the cell formulas and corresponding math.

Comment 3: *In Comment No. 2 of our previous letter, we requested that the chart on Page 9 of the Oil and Gas Waste Processing Plan be revised to include the three leachate evaporation ponds to be used for storage of processed oil and gas wastewater. The response was that only one of the existing (now four) leachate evaporation ponds would be used for storage of oil and gas processed wastewater and a revision to the text on Pages 12 and 13 was made to attempt to clarify this fact. The revision remains unclear, and it is requested that a statement by made in the application that only one leachate evaporation pond will be used at any one time. The text should be revised to discuss the removal of all leachate and contaminated water from any leachate evaporation pond prior to its use for storage of oil and gas processed wastewater. In addition, the leachate evaporation ponds are listed as a note below the chart of oil and gas processing equipment on Page 9 as "ancillary equipment". Please revise the chart to include the "ancillary equipment" within the chart to clearly depict all of the significant waste management units comprising the oil and gas waste processing facility.*

Response to Comment 3: The changes requested above have been made to Section 3.2.1 and Table IV-I-1.

Comment 4: *The closure cost estimate in the initial submittal on Page 22 provides an estimate for the disposal of approximately 261,000 gallons of processed wastewater. It does not appear that the wastewater to be stored in one of the leachate evaporation ponds (average capacity of approximately 3.5 million gallons) has been accounted for in the cost estimate. Please provide information in the oil and gas waste processing plan and the cost estimate for closure that addresses the cost associated with disposal of the contents of one of the leachate ponds.*

Response to Comment 4: The quantity of wastewater that may be stored in one of the lined evaporation ponds was not included in the closure cost estimate for the oil and gas waste processing facility because the wastewater will be disposed/removed by evaporation (i.e., no cost).

Comment 5: *It is noted that two pages numbered Page 21 were submitted in the NOD response. Page 21 contains a chart of closure costs associated with the oil and gas water processing facility. The total cost for closure on one of the pages is $98,940.00 and $119,277.00 on the other page. The replacement page (clean copy) containing the chart notes the $119,277 figure. It is not clear why the cost estimate was revised and what specific figures in the estimate were revised. Please discuss the proposed revisions and provide Page 21 with the revisions clearly noted as required by 30 TAC § 305.70(e).*

Response to Comment 5: Please see our response to Comment 1.

Comment 6: *In Comment No. 3 of our previous letter, we requested that either the paint filter test for free liquids be retained as the test method for evaluating the centrifuge solids or an alternative method be proposed. The response was that a visual evaluation would be performed. We have concluded that the paint filter test (Environmental Protection Agency Method 9095) should be retained as the procedure for determining the presence of liquid waste, as defined in 30 TAC § 330.3 (81). Please revise the application to reflect the continued use of the paint filter test.*

Response to Comment 6: Section 2.2 of the Oil and Gas Waste Processing Plan has been revised as requested.

Comment 7: *In Comment No. 4 of our previous letter, we requested a procedure be proposed for testing the radiation level of the solids generated by the centrifuge to ensure the material is NORM-exempt. The response was that the Railroad Commission permit for the facility addresses the testing of oil and gas wastes being received for processing, and that further testing should not be necessary. The response also stated that the wastes received at the facility are NORM-exempt, and that the wastes maintain the NORM-exempt status after processing. We agree that the Railroad Commission permit addresses the inspection requirements for the waste received at the facility. Please ensure that the landfill's waste inspection and recordkeeping procedures in Permit 2093B are consistent with the Railroad Commission permit requirements and submit any necessary revisions for consistency. On the matter of NORM-exempt status of oil and gas waste, we stated in our*

previous letter that the concentrated solids from the centrifuge could reasonably be expected to emit radiation. The exemption status of all oil and gas NORM waste is based on radiation emission levels as defined in Title 25 Texas Administrative Code § 289.259(d). To that end, the solids generated in the centrifuge process should be tested for radiation. We feel that the testing procedure specified in Section II.B. of the facility's Railroad Commission permit would be an acceptable procedure. Alternatively, the solids could be evaluated in the same manner as oil and gas waste centrifuge solids being received from an offsite third party generator. Please revise the application to address testing of the centrifuge solids.

Response to Comment 7: Section 1.3.1 of the Oil and Gas Waste Processing Plan has been revised to incorporate by reference the incoming waste testing requirements set forth in the Railroad Commission of Texas (RRC) Permit for the Separation facility. Section 2.2 of the Oil and Gas Waste Processing Plan has been revised to include post-processing radiation testing of the solids. As suggested, we have specified the same radiation testing procedure as given in Section II.B of the RRC Permit for this facility.

Section 3.12.1 of the Oil and Gas Waste Processing Plan has been revised in a similar manner to incorporate the waste recordkeeping requirements.

Comment 8: The title page for Oil and Gas Waste Processing Plan should be revised to include the enumerated section (Appendix IV – I) noted in the Site Operating Plan table of contents for consistency with the other appendices in the approved permit application.

Response to Comment 8: The requested revision has been made.

PART I FORM AND CERTIFICATION STATEMENT

Pages 1 and 5 of the Part I Form are being submitted with this response. Page 5, the Signature Page, provides the certification statement signed by the applicant's responsible official.

CLOSURE

One original and two copies of this submittal are being provided to the TCEQ MSW Permits Section in Austin. Also, one copy has been sent directly to TCEQ Region 13 Office, as indicated on the distribution list at the end of this letter. An electronic copy of this submittal has also been posted to the internet at the same URL as the initial posting of the application. Geosyntec trusts that the above responses to TCEQ's comments provide the necessary information requested by TCEQ to complete their technical review of the permit modification. If you have any questions regarding the information presented in this letter, please do not hesitate to contact the undersigned by telephone at (512) 451-4003, or by E-mail at sgraves@geosyntec.com.

Sincerely,

Scott M. Graves, P.E.
Associate, Geosyntec Consultants, Inc.

Copy to: Mr. Cameron Lopez, TCEQ Region 13 Office
Mr. Tim Champagne, WMTX

PART I FORM UPDATE PAGES

(includes Applicant's Certification Statement)

The pages that follow are updates to the Part I Form which include the applicant's certification statement for this submittal.

Facility Name: Covel Gardens Landfill
Permittee/Registrant Name: Waste Management of Texas, Inc.
MSW Authorization #: 2093B
Initial Submittal Date: 4-4-2014
Revision Date: 9-2-2014

Texas Commission on Environmental Quality

Permit/Registration Modification and Temporary Authorization Application Form for an MSW Facility

1. Reason for Submittal

☐ Initial Submittal ☒ Notice of Deficiency (NOD) Response

2. Authorization Type

☒ Permit ☐ Registration

3. Application Type

☒ Modification with Public Notice ☐ Modification without Public Notice
☐ Temporary Authorization (TA) ☐ Modification for Name Change/Transfer

4. Application Fees

☐ Pay by Check ☒ Online Payment

If paid online, e-Pay Confirmation Number: 582EA000164351

5. Application URL

Is the application submitted for a permit/registration modification with public notice?

☒ Yes ☐ No

If the answer is "Yes", enter the URL address of a publicly accessible internet web site where the application and all revisions to that application will be posted in the space provided: http:// www0.wm.com/wm/texas/permits.asp

6. Confidential Documents

Does the application contain confidential documents?

☐ Yes ☒ No

If "Yes", cross-reference the confidential documents throughout the application and submit as a separate attachment in a binder clearly marked "CONFIDENTIAL."

Signature Page

I, Steve Jacobs, Director of Disposal Operations,
(Site Operator (Permittee/Registrant)'s Authorized Signatory) (Title)

certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: _____ Date: 9-2-2014

TO BE COMPLETED BY THE OPERATOR IF THE APPLICATION IS SIGNED BY AN AUTHORIZED REPRESENTATIVE FOR THE OPERATOR

I, _____ , hereby designate _____
(Print or Type Operator Name) (Print or Type Representative Name)

as my representative and hereby authorize said representative to sign any application, submit additional information as may be requested by the Commission; and/or appear for me at any hearing or before the Texas Commission on Environmental Quality in conjunction with this request for a Texas Water Code or Texas Solid Waste Disposal Act permit. I further understand that I am responsible for the contents of this application, for oral statements given by my authorized representative in support of the application, and for compliance with the terms and conditions of any permit which might be issued based upon this application.

_____
Printed or Typed Name of Operator or Principal Executive Officer

_____
Signature

SUBSCRIBED AND SWORN to before me by the said _____

On this 2nd day of September, 2014

My commission expires on the 27th day of July, 2016

_____
Notary Public in and for

_____ County, Texas
(Note: Application Must Bear Signature & Seal of Notary Public)

REDLINE/STRIKETHROUGH PAGES

To facilitate TCEQ's review, the attached pages present a "redline/strikethrough" version of the following items, showing the proposed revisions:

- Part III (Site Development Plan), Attachment 8 – Closure and Post Closure Cost Estimates (Cover Page and Section 4); and

  Part IV – Appendix IV-I, Oil and Gas Waste Processing Plan (Cover Page and Sections 1.3.1, 2.2, Table IV-I-1, 3.2.1, and 3.12).

Prepared for Applicant:
Waste Management of Texas, Inc.
8611 Covel Road
San Antonio, Texas 78252
(210) 623-8800

PERMIT AMENDMENT APPLICATION
PART III – SITE DEVELOPMENT PLAN
ATTACHMENT 8

CLOSURE AND POST-CLOSURE CARE COST ESTIMATE

COVEL GARDENS LANDFILL
SAN ANTONIO, BEXAR COUNTY, TEXAS
PERMIT NO. MSW - 2093B

Prepared by:

GeoSyntec Consultants
3600 Bee Caves Road, Suite 101
Austin, Texas 78746
(512) 451-4003

Rev. 0, Initial Application Submittal – 31 March 2005
Response to NOD 1 – 27 July 2005
Response to NOD 2 – 30 August 2005
Technically Complete – 28 October 2005
Permit Issued – 29 June 2006
Revised – September~~July~~ 2014

4. FACILITY COMBINED CLOSURE AND POST-CLOSURE COST ESTIMATE

The purpose of this section is to present the combined closure and post-closure costs consistent dollars, for the purposes of identifying the amount of financial assurance required for the facility in consistent dollars. This adjustment calculation is presented below:

COVEL GARDENS LANDFILL

COMBINED CLOSURE & POST-CLOSURE COST ESTIMATE FOR FACILITY

ITEM	COST ESTIMATE AT TIME SUBMITTED		COMPOUNDED INFLATION FACTOR FOR ADJUSTMENT TO 2013 DOLLARS (Notes 2 and 3)	UPDATED COST, 2013 DOLLARS (Note 3)
	Amount	Year		
Landfill Closure/Post-Closure	$18,207,506	2004	1.197	$21,798,256
Brush and Wood Recycling Area	$507,576	2009	1.066	$540,832
Oil and Gas Waste Processing Facility	$98,940	2014	1.00	$119,277
			FACILITY CLOSURE/POST-CLOSURE COST ESTIMATE:	**$22,458,364**

(1) The purpose of this table is to adjust the facility closure/post-closure costs to a consistent dollar (year) basis.

(2) Inflation factors are provided by TCEQ on the following webpage: https://www.tceq.texas.gov/adminservices/financial-assurance/revenue/annual_inflation_factors.html.

Year	TCEQ Inflation Factor	Compounding factor from 2004	Compounding factor from 2009	
2004	2.6%	1		
2005	2.8%	1.028		
2006	2.9%	1.058		
2007	2.7%	1.086		
2008	2.2%	1.110		
2009	1.2%	1.124	1	
2010	1.0%	1.135	1.010	
2011	2.1%	1.159	1.031	
2012	1.8%	1.180	1.050	
2013	1.5%	1.197	1.066	

(3) At the time of the initial submittal of the permit modification associated with the revision to this table in June 2014, the latest year for which TCEQ has published inflation factors is 2013. Even though the oil and gas waste processing facility closure costs are calculated in 2014 dollars, they are conservatively reported as 2013 dollars (instead of de-flating them from 2014 to 2013 dollars).

COVEL GARDENS LANDFILL

COMBINED CLOSURE & POST-CLOSURE COST ESTIMATE FOR FACILITY

ITEM	COST ESTIMATE AT TIME SUBMITTED		COMPOUNDED INFLATION FACTOR FOR ADJUSTMENT TO 2013 DOLLARS (Notes 2 and 3)	UPDATED COST, 2013 DOLLARS (Note 3)
	Amount	Year		
Landfill Closure	$11,558,854	2004	1.197	$13,838,406
Landfill Post-Closure	$6,648,642	2004	1.197	$7,959,838
Brush and Wood Recycling Area	$507,576	2009	1.066	$540,832
Oil and Gas Waste Processing Facility	$119,277	2014	1.00	$119,277
			FACILITY CLOSURE/POST-CLOSURE COST ESTIMATE:	**$22,458,352**

(1) The purpose of this table is to adjust the facility closure/post-cosure costs to a consistent dollar (year) basis.

(2) Inflation factors are provided by TCEQ on the following webpage:
https://www.tceq.texas.gov/adminservices/financial-assurance/revenue/annual_inflation_factors.html.

Year	TCEQ Inflation Factor	Compounding factor from 2004	Compounding factor from 2009	
2004	2.6%	1		
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2007	2.7%	1.086		
2008	2.2%	1.110		
2009	1.2%	1.124	1	
2010	1.0%	1.135	1.010	
2011	2.1%	1.159	1.031	
2012	1.8%	1.180	1.050	
2013	1.5%	1.197	1.066	

(3) At the time of the initial submittal of the permit modification associated with the revision to this table in June 2014, the latest year for which TCEQ has published inflation factors is 2013. Even though the oil and gas waste processing facility closure costs are calculated in 2014 dollars, they are conservatively reported as 2013 dollars (instead of de-flating them from 2014 to 2013 dollars).

Shading is for review copy only, to identify which items were revised.

Prepared for:

Waste Management of Texas, Inc.
8611 Covel Road
San Antonio, Texas 78252
(210) 623-8800

OIL AND GAS WASTE PROCESSING PLAN
PART IV – APPENDIX IV-I

COVEL GARDENS LANDFILL
MSW PERMIT NO. 2093B
SAN ANTONIO, BEXAR COUNTY, TEXAS

Prepared by:

Geosyntec consultants
8217 Shoal Creek Blvd, Suite 200
Austin, Texas 78757
(512) 451-4003

April 2014
Revised SeptemberJuly 2014

TABLE OF CONTENTS

TABLES

DRAWINGS

1.2 Oil and Gas Waste Processing Facility Location

The oil and gas waste processing facility will be located on waste above lined and approved Class 1 waste cell landfill areas. A site map showing the initial location of the facility is included with this plan as Drawing IV-I-1. The layout and features of the processing facility are presented on Drawings IV-I-2, IV-I-3, and IV-I-4. Design details are shown on attached Drawing IV-I-5.

1.3 Waste Acceptance and Analysis – Sources and Characteristics of Oil and Gas Waste

1.3.1 Oil and Gas Waste Defined

Oil and gas waste is a special waste defined by 30 TAC §330.3(148) as, "*waste from oil, gas, and geothermal activities subject to regulation by the Railroad Commission of Texas when those wastes are to be processed, treated, or disposed of at a solid waste management facility authorized under this chapter*". A similar definition of oil and gas wastes is provided in the Memorandum of Understanding (MOU) between the RRC and the TCEQ set forth in 16 TAC §3.30(b)(2)(A)(i) as follows: "*wastes resulting from activities associated with the exploration, development, or production of oil, gas, or geothermal resources, including storage, handling, reclamation, gathering, transportation, or distribution of crude oil or natural gas by pipeline prior to the refining of such oil or prior to the use of such gas…*" Only non-hazardous oil and gas wastes under the jurisdiction of RRC and authorized for management at a municipal solid waste landfill pursuant to applicable RRC and TCEQ memoranda of understanding and regulation may be accepted.

Through the Special Waste Acceptance Plan (Appendix IV-A of the Site Operating Plan (SOP)), the facility is authorized to accept this type of waste. The facility will follow the requirements of the Special Waste Acceptance Plan before accepting oil and gas waste. The oil and gas waste separation facility also has received a RRC Permit which has testing requirements for incoming waste that will be processed by the RRC-permitted separation facility. Those incoming wastes will be tested in accordance with the RRC permit requirements (RRC Permit Condition II.B).

1.3.2 Oil and Gas Waste to be Processed by Centrifuge or by Thermal Unit

A broad definition of oil and gas waste was provided above. Only a subset of this category of waste will be processed by centrifuge or by thermal unit, because not all oil

- Step 4) solids from both the Shaker Tank(s) and Centrifuge(s) will accumulate at the solids discharge areas into a container/box for disposal at the appropriate working face (after verifying that no free liquids are present); and
- Step 5) separated liquids remaining after initial centrifuge processing will be in two phases – water and oil. Additional centrifuging may be utilized as needed to separate oil and water. Also, a Dissolved Air Flotation (DAF) unit will be used to help separate oil and water. The separated liquid will be either transferred back to the designated oil and gas waste basins for solidification, or transferred to the appropriate tank (Recovered Water Tank or the Recovered Oil Tank) and further managed/disposed of as described in Section 2.2 below.

Processing at Thermal Site

- Step 1) oil and gas waste to be processed by the thermal unit will be transported from the designated basins into the thermal unit for subsequent heating;
- Step 2) solids will move into the Ash Cooler for cooling, and will accumulate at the solids discharge area into a container/box for disposal at the appropriate working face (after verifying that no free liquids are present);
- Step 3A) separated liquids will be condensed, and if further processing is necessary, will be transported to the centrifuge site to achieve better separation of the water and oil;
- Step 3B) if the separation of the water and oil is deemed satisfactory, the separated liquid will be either transferred back to the designated oil and gas waste basins for solidification, or transferred to the appropriate tank (Recovered Water Tank or the Recovered Oil Tank) and further managed/disposed of as described in Section 2.2 below.

2.2 Destinations of Processed Waste (Post Processing)

The destination of the processed oil and gas waste materials is as follows:

- Separated solids described as "Centrifuge Solids" will be disposed of at the Class 1 waste working face after performing the following steps:
    1. V~~v~~erifying that no free liquids are present~~)~~. This verification shall be made by performing a paint filter test (EPA Method 9095B) for each batch of solids.

2. Scanning for the presence of naturally occurring radioactive material (NORM) using a scintillation meter with a sodium iodide detector or equivalent. Material with a maximum reading of 50 microroentgens per hour will be further evaluated to demonstrate that the waste does not exceed 30 picocuries per gram Radium-226 combined with Radium-228 and 150 picocuries per gram of all other radionuclides following the procedures described in 25 TAC §289.259(d). Waste not meeting these requirements must be shipped off-site to a duly-permitted disposal facility that can accept this type of waste.

- The separated water-phase oil and gas waste (which is primarily a briny water) will be either: (i) solidified in accordance with Part IV, Sub-Appendix IV-A-1; (ii) managed as contaminated water as described in Part III, Attachment 15 (Leachate and Contaminated Water Plan); or (iii) transported to a duly permitted/registered off-site disposal facility (e.g., a Class II injection well) that is authorized to accept this type of oil and gas related water waste.
- The separated oil-phase material (which is primarily spent diesel used in drilling fluids, along with incidental amounts of crude oil) that is recovered from the centrifuge process will be transported to an authorized off-site oil processing/reclamation facility that is permitted or authorized to receive this type of reclaimed material.

2.3 Off-Site Transport of Post-Processed Oil and Gas Wastes

The off-site transport of the post-processed oil and gas wastes (i.e., the reclaimed oil and the separated water) shall be subject to applicable RRC requirements. For as long as these materials are within the facility's custody, the facility shall comply with all applicable RRC requirements regarding management of this waste (manifesting, recordkeeping, reporting, quantity records, verification of movement, etc.). Recovered oil and gas waste that will be transported off-site shall not be comingled with other wastes (e.g., solid waste, or non-oil and gas wastes) and will be transported and managed as required by TCEQ, RRC and TXDOT rules and requirements.

TABLE IV-1-1
LIST OF EQUIPMENT - OIL AND GAS WASTE PROCESSING FACILITY
COVEL GARDENS LANDFILL

ITEM	DESCRIPTION OF MAXIMUM SIZE	CAPACITY (gallons, unless noted)	MAXIMUM NUMBER OF ITEMS	TOTAL MAXIMUM WASTE HOLDING CAPACITY (gallons, unless noted)
METAL BASIN	30' X 21' X 9' (7' depth of holding capacity)	32,989	4	131,956
REINFORCED CONCRETE BASIN WITH SACRIFICIAL METAL LINING	25' X 24' X 8' (6' depth of holding capacity)	26,930	8	215,439
SHAKER TANKS	400 Barrels	16,800	2	33,600
FEED TANKS	400 Barrels	16,800	8	134,400
CENTRIFUGES	50 - 100 gpm for single phase centrifuge (with 150 gal catch tank); 150 - 250 gpm for dual phase centrifuge (with two x90 gal catch tanks)		11	1,980
DISSOLVED AIR FLOTATION (DAF)	Trailer or skid-mounted unit with 3600 gal. tank	3,600	2	7,200
ROLL-OFF CONTAINER	40-yard Dumpster	40 cubic yards (solid material, not reported in gallons)	6	240 cubic yards
3-SIDED BOX CONTAINER	30' X 20' X 10' tall (open side, capacity smaller than full dimensions)	200 cubic yards (solid material, not reported in gallons)	1	200 cubic yards
RECOVERED LIQUID TANKS	500 Barrels	21,000	16	336,000
FRAC TANKS	500 Barrels	21,000	15	315,000
MAXIMUM COMBINED OIL AND GAS LIQUID WASTE QUANTITY AT CENTRIFUGE PROCESSING AREA HELD IN TANKS/EQUIPMENT WITHIN SECONDARY CONTAINMENT AREA (gallons):				828,180
QUANTITY ESTIMATES: MAXIMUM QUANTITY OF OIL AND GAS WASTES PRESENT AT ANY ONE POINT IN TIME AT THE CENTRIFUGE PROCESSING AREAS				
UNPROCESSED OIL AND GAS WASTE (basins, shaker tanks, feed tanks) (gallons):				830,395
PROCESSED OIL AND GAS WASTE - SEPARATED LIQUIDS (WATER AND OIL) (recovered liquids tanks and centrifuge catch tanks) (gallons):				345,180
PROCESSED OIL AND GAS WASTE - SEPARATED SOLIDS (box containers) (cubic yards):				440
COMBINED OIL AND GAS LIQUID WASTES (BOTH UNPROCESSED AND PROCESSED) (gallons):				1,175,575

TABLE IV-I-1
LIST OF EQUIPMENT - OIL AND GAS WASTE PROCESSING FACILITY
COVEL GARDENS LANDFILL

ITEM	DESCRIPTION OF MAXIMUM SIZE	CAPACITY (gallons, unless noted)	MAXIMUM NUMBER OF ITEMS	TOTAL MAXIMUM WASTE HOLDING CAPACITY (gallons, unless noted)
METAL BASIN	30' X 21' X 9' (7' depth of holding capacity)	32,989	4	131,956
REINFORCED CONCRETE BASIN WITH SACRIFICIAL METAL LINING	25' X 24' X 8' (6' depth of holding capacity)	26,930	8	215,439
SHAKER TANKS	400 Barrels	16,800	2	33,600
FEED TANKS	400 Barrels	16,800	8	134,400
CENTRIFUGES	50 - 100 gpm for single phase centrifuge (with 150 gal catch tank); 150 - 250 gpm for dual phase centrifuge (with two x 90 gal catch tanks)		11	1,980
DISSOLVED AIR FLOTATION (DAF)	Trailer or skid-mounted unit with 3600 gal. tank	3,600	2	7,200
ROLL-OFF CONTAINER	40-yard Dumpster	40 cubic yards (solid material, not reported in gallons)	6	240 cubic yards
3-SIDED BOX CONTAINER	30' X 20' X 10' tall (open side, capacity smaller than full dimensions)	200 cubic yards (solid material, not reported in gallons)	1	200 cubic yards
RECOVERED LIQUID TANKS	500 Barrels	21,000	16	336,000
FRAC TANKS	500 Barrels	21,000	15	315,000
MAXIMUM COMBINED OIL AND GAS LIQUID WASTE QUANTITY AT OIL AND GAS WASTE PROCESSING AREA HELD IN TANKS/EQUIPMENT WITHIN SECONDARY CONTAINMENT AREA (gallons):				828,180
QUANTITY ESTIMATES: MAXIMUM QUANTITY OF OIL AND GAS WASTES PRESENT AT ANY ONE POINT IN TIME AT THE OIL AND GAS WASTE PROCESSING AREAS				
UNPROCESSED OIL AND GAS WASTE (basins, shaker tanks, feed tanks) (gallons):				830,395
PROCESSED OIL AND GAS WASTE - SEPARATED LIQUIDS (WATER AND OIL) (recovered liquids tanks and centrifuge catch tanks) (gallons):				345,180
PROCESSED OIL AND GAS WASTE - SEPARATED SOLIDS (box containers) (cubic yards):				440
COMBINED OIL AND GAS LIQUID WASTES (BOTH UNPROCESSED AND PROCESSED) (gallons):				1,175,575
QUANTITY ESTIMATES: OIL AND GAS WASTEWATER THAT MAY BE PRESENT IN ONE OF THE FOLLOWING ON-SITE LINED EVAPORATION PONDS AT A TIME (SEE SECTION 3.2.1 FOR PROVISIONS OF POND USAGE)				
POND C (gallons):				2,939,300
POND D (gallons):				3,823,200
POND E (gallons):				3,652,200
POND F (gallons):				3,329,200
MAXIMUM QUANTITY POTENTIALLY PRESENT AT ONE TIME IN EVAPORATION POND (I.E., THE LARGEST POND CAPACITY) (gallons):				3,823,200
	Shading is for review copy only, to identify which items were revised.			

Notes: (1) Centrifuge throughput is dependent on solids content and can vary widely.

~~(2) Capacities of ancillary components – on-site lined evaporation ponds (See Section 3.2.1 for provisions of pond usage).~~

~~Pond C: 2,939,300 gallons;~~
~~Pond D: 3,823,200 gallons;~~

~~Pond E: 3,652,200 gallons;~~
~~Pond F: 3,329,200 gallons.~~

existing on-site lined evaporation ponds that will be reserved for exclusive use to hold processed oil and gas waste water only). Only one evaporation pond may be used at any one time, and all leachate and/or contaminated water must be removed from that pond prior to its use for storage of oil and gas processed wastewater. Any oil and gas waste water that is transported off-site for disposal must not be mixed with contaminated water or leachate.

Contaminated water shall not be discharged from the site without specific written TCEQ authorization. Furthermore, the oil and gas waste processing facility will be operated in accordance with 30 TAC §330.15(h) regarding the prohibition of discharges of solid wastes or pollutants into waters of the United States.

The generation of contaminated water will be minimized by a combination of site grading (to direct stormwater run-on away from and around the oil and gas waste processing facility), and earthen berms surrounding the processing facility to intercept and divert stormwater run-on from entering the areas).

3.2.2 Spill Prevention and Control (Containment)

Vehicle Unloading and Basin Secondary Containment Liner. Vehicle unloading of oil and gas waste will take place at the designated basins. The basins will be recessed below-grade and will be surrounded by a secondary containment liner composed of a minimum of 3-ft thick low permeability ($k \leq 1 \times 10^{-7}$ cm/s) compacted clay liner around the sides and bottom as shown on Drawing IV-I-5. For surface containment and control, the concrete basins have a concrete approach ramp sloped to drain into the basins. At the steel basins, the ground surface immediately adjacent to the basins where they unload will be graded to drain towards the basins. Spilled or leaked waste in and around the vehicle unloading area and basins will be cleaned up using soil or other absorbent material/solidifying agents to remove free liquids, followed by disposal in the landfill.

Centrifuge Site and Thermal Site – Secondary Containment Liner. As shown on Drawings IV-I-2 through 5, the centrifuge site and the thermal site will have a secondary containment liner surrounding the floor and sides of the area, composed of either concrete or compacted clay liner. The secondary containment liner is sized according to the following design criteria (whichever is greater):

(i) the volume of the 25-year, 24-hour storm plus the volume of the largest storage container; or
(ii) the volume of the 25-year, 24-hour storm plus 10% of the combined volume of all the containers within the contained area.

nuisance, for example, by making the processing of those liquids the immediate priority in order to alleviate that odor.

3.10 Health and Safety

Training requirements of site personnel are discussed in Section 5.4, of the SOP. This includes training on health and safety topics.

3.11 Employee Sanitation Facilities

Potable water and sanitary facilities are provided for all employees and visitors within the office building at the site. Additional facilities may be added to the oil and gas waste processing facility for the convenience of site personnel and visitors.

3.12 Inspections, Recordkeeping, and Reporting Requirements

3.12.1 Waste Recordkeeping

Incoming wastes associated with the oil and gas waste separation facility will be subject to the testing and recordkeeping requirements set forth in the RRC Permit Conditions II.B and III.

For separated solids that are disposed of in the landfill, the results of the testing required in Section 2.2 of this plan (showing passing results) will be documented and maintained in hardcopy or electronic format as part of the Site Operating Record for a minimum period of three years as described in the RRC permit.

3.12.2~~1~~ Oil and Gas Waste Processing Facility Inspections

Basins: At least once per month, the Site Manager or designated alternate will conduct a visual inspection of the basins to check for holes, cracks, gaps, spalls, or other signs of damage, and if found to be significant enough to potentially compromise the structural integrity of the basin, the basin will not be used until repairs are made. Once per year, a more thorough inspection of the basins will be made by emptying each basin and visually inspecting the walls and floor.

Secondary Containment: At least once per month, the Site Manager or Designated alternate will inspect the secondary containment (concrete or earthen liner as described

in Section 3.2.2) surrounding the centrifuge site and thermal site to verify the integrity, ensure that controls are in place, and that housekeeping is adequate.

Processing Equipment: At least once per month, the Site Manager or designated alternate will conduct a visual inspection of the centrifuge(s), thermal unit, associated processing equipment, and the storage tanks. The purpose of the visual inspection will be to ensure no leaking valves or connections exist in the equipment.

If the results of any of the above inspections reveal non-compliances or problems with the function of the equipment/feature, corrective action shall be promptly taken to remedy/repair the issue and restore adequate function and compliance of the area operations.

3.12.3~~2~~ Recordkeeping, Reporting, and Notification Requirements

The results of the inspections described herein will be documented in writing and placed in the Site Operating Record.

Also, TCEQ shall be notified in writing at least 30 days prior to relocation of the oil and gas waste processing facility. The notification will include an updated Drawing IV-I-1 or equivalent plan of the site, to show the new location.

REPLACEMENT PAGES

The items that follow are to completely replace the previous versions of these pages.

- Part III (Site Development Plan), Attachment 8 – Closure and Post Closure Cost Estimates (Cover Page, Table of Contents, and Section 4); and

- Part IV – Appendix IV-I, Oil and Gas Waste Processing Plan [Due to repagination, please replace the entire plan narrative (Cover Page, Table of Contents, and Pages 1 through 22) – reflecting changes to the Cover Page and Sections 1.3.1, 2.2, Table IV-I-1, 3.2.1, and 3.12].

Prepared for Applicant:
Waste Management of Texas, Inc.
8611 Covel Road
San Antonio, Texas 78252
(210) 623-8800

PERMIT AMENDMENT APPLICATION
PART III – SITE DEVELOPMENT PLAN
ATTACHMENT 8

CLOSURE AND POST-CLOSURE CARE COST ESTIMATE

COVEL GARDENS LANDFILL
SAN ANTONIO, BEXAR COUNTY, TEXAS
PERMIT NO. MSW - 2093B

Prepared by:

FOR PERMIT PURPOSES ONLY

GEOSYNTEC CONSULTANTS, INC.
TEXAS ENG. FIRM REGISTRATION NO. F-1182

GeoSyntec Consultants
3600 Bee Caves Road, Suite 101
Austin, Texas 78746
(512) 451-4003

Rev. 0, Initial Application Submittal – 31 March 2005
Response to NOD 1 – 27 July 2005
Response to NOD 2 – 30 August 2005
Technically Complete – 28 October 2005
Permit Issued – 29 June 2006
Revised – September 2014

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9/2/2014

FOR PERMIT PURPOSES ONLY

GEOSYNTEC CONSULTANTS, INC.
TEXAS ENG. FIRM REGISTRATION NO. F-1182

4. FACILITY COMBINED CLOSURE AND POST-CLOSURE COST ESTIMATE

The purpose of this section is to present the combined closure and post-closure costs consistent dollars, for the purposes of identifying the amount of financial assurance required for the facility in consistent dollars. This adjustment calculation is presented below:

COVEL GARDENS LANDFILL

COMBINED CLOSURE & POST-CLOSURE COST ESTIMATE FOR FACILITY

ITEM	COST ESTIMATE AT TIME SUBMITTED		COMPOUNDED INFLATION FACTOR FOR ADJUSTMENT TO 2013 DOLLARS (Notes 2 and 3)	UPDATED COST, 2013 DOLLARS (Note 3)
	Amount	Year		
Landfill Closure	$11,558,854	2004	1.197	$13,838,406
Landfill Post-Closure	$6,648,642	2004	1.197	$7,959,838
Brush and Wood Recycling Area	$507,576	2009	1.066	$540,832
Oil and Gas Waste Processing Facility	$119,277	2014	1.00	$119,277
			FACILITY CLOSURE/POST-CLOSURE COST ESTIMATE:	**$22,458,352**

(1) The purpose of this table is to adjust the facility closure/post-cosure costs to a consistent dollar (year) basis.

(2) Inflation factors are provided by TCEQ on the following webpage:
https://www.tceq.texas.gov/adminservices/financial-assurance/revenue/annual_inflation_factors.html.

Year	TCEQ Inflation Factor	Compounding factor from 2004	Compounding factor from 2009	
2004	2.6%	1		
2005	2.8%	1.028		
2006	2.9%	1.058		
2007	2.7%	1.086		
2008	2.2%	1.110		
2009	1.2%	1.124	1	
2010	1.0%	1.135	1.010	
2011	2.1%	1.159	1.031	
2012	1.8%	1.180	1.050	
2013	1.5%	1.197	1.066	

(3) At the time of the initial submittal of the permit modification associated with the revision to this table in June 2014, the latest year for which TCEQ has published inflation factors is 2013. Even though the oil and gas waste processing facility closure costs are calculated in 2014 dollars, they are conservatively reported as 2013 dollars (instead of de-flating them from 2014 to 2013 dollars).

Prepared for:

Waste Management of Texas, Inc.
8611 Covel Road
San Antonio, Texas 78252
(210) 623-8800

OIL AND GAS WASTE PROCESSING PLAN
PART IV – APPENDIX IV-I

COVEL GARDENS LANDFILL
MSW PERMIT NO. 2093B
SAN ANTONIO, BEXAR COUNTY, TEXAS

Prepared by:

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9/2/2014

FOR PERMIT PURPOSES ONLY

GEOSYNTEC CONSULTANTS, INC.
TEXAS ENG. FIRM REGISTRATION NO. F-1182

April 2014
Revised September 2014

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9/2/2014

STATE OF TEXAS
SCOTT M. GRAVES
86557
LICENSED
PROFESSIONAL ENGINEER

FOR PERMIT PURPOSES ONLY

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REGISTRATION NO. F-1182

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FOR PERMIT PURPOSES ONLY

GEOSYNTEC CONSULTANTS, INC.
TEXAS ENG. FIRM
REGISTRATION NO. F-1182

APPENDIX

1. INTRODUCTION

1.1 Overview

The Covel Gardens Landfill facility is a Type I landfill located in Bexar County, Texas. This document presents an Oil and Gas Waste Processing Plan that describes how "oil and gas waste" liquid waste (defined subsequently in Section 1.3 of this plan) will be processed and handled at the facility using a centrifuge processing or thermal processing technique. This Plan has been developed to address the applicable sections of 30 TAC Chapter 330 Subchapter E of the TCEQ Municipal Solid Waste Management Regulations (MSWMR) "Operational Standards for Solid Waste Storage and Processing Units", so that operations are conducted in a manner consistent with the facility design and permit, and the Texas Commission on Environmental Quality (TCEQ) rules to protect human health and the environment.

For the purposes of this plan, a centrifuge unit and a thermal unit are types of equipment that separate waste into a solid-phase and its liquid (oil and water) phases. As the centrifuge name suggests, the separation is accomplished though a high-speed rotating drum that induces centrifugal forces on the waste mass and divides the material into denser and lighter fractions (i.e., solid and liquids). For wastes that do not meet the liquid consistency preferred for centrifuging, the thermal unit can be used to heat and subsequently cool or condense the waste into three phases solid (ash), water, and oil. After processing the oil and gas waste, the separated solids will be disposed of in a Class 1 non-hazardous industrial waste disposal landfill cell at the facility. The separated water and oil will go to the destinations described in Section 2.2 of this plan.

The remainder of this Plan is organized as follows:

- location of the oil and gas waste processing facility is described in Section 1.2;
- waste acceptance and analysis is addressed in Section 1.3;
- descriptions of the centrifuge and thermal processing sequence, technique, equipment, and quantities/rates are presented in Section 2;
- other operational requirements (addressing applicable 30 TAC Chapter 330 Subchapter E sections) are presented in Section 3; and
- closure requirements and costs are presented in Section 4.

1.2 Oil and Gas Waste Processing Facility Location

The oil and gas waste processing facility will be located on waste above lined and approved Class 1 waste cell landfill areas. A site map showing the initial location of the facility is included with this plan as Drawing IV-I-1. The layout and features of the processing facility are presented on Drawings IV-I-2, IV-I-3, and IV-I-4. Design details are shown on attached Drawing IV-I-5.

1.3 Waste Acceptance and Analysis – Sources and Characteristics of Oil and Gas Waste

1.3.1 Oil and Gas Waste Defined

Oil and gas waste is a special waste defined by 30 TAC §330.3(148) as, "*waste from oil, gas, and geothermal activities subject to regulation by the Railroad Commission of Texas when those wastes are to be processed, treated, or disposed of at a solid waste management facility authorized under this chapter*". A similar definition of oil and gas wastes is provided in the Memorandum of Understanding (MOU) between the RRC and the TCEQ set forth in 16 TAC §3.30(b)(2)(A)(i) as follows: "*wastes resulting from activities associated with the exploration, development, or production of oil, gas, or geothermal resources, including storage, handling, reclamation, gathering, transportation, or distribution of crude oil or natural gas by pipeline prior to the refining of such oil or prior to the use of such gas…*" Only non-hazardous oil and gas wastes under the jurisdiction of RRC and authorized for management at a municipal solid waste landfill pursuant to applicable RRC and TCEQ memoranda of understanding and regulation may be accepted.

Through the Special Waste Acceptance Plan (Appendix IV-A of the Site Operating Plan (SOP)), the facility is authorized to accept this type of waste. The facility will follow the requirements of the Special Waste Acceptance Plan before accepting oil and gas waste. The oil and gas waste separation facility also has received a RRC Permit which has testing requirements for incoming waste that will be processed by the RRC-permitted separation facility. Those incoming wastes will be tested in accordance with the RRC permit requirements (RRC Permit Condition II.B).

1.3.2 Oil and Gas Waste to be Processed by Centrifuge or by Thermal Unit

A broad definition of oil and gas waste was provided above. Only a subset of this category of waste will be processed by centrifuge or by thermal unit, because not all oil

and gas waste is composed of materials conducive to these processing techniques. For example, some oil and gas waste accepted at the facility is already solid (passes the paint filter test) and can be directly disposed without the need for processing. The oil and gas waste that will be processed by centrifuging will be liquid or semi-solid, and will be primarily made up of drilling fluids (including water-based and oil-based fluids), fracturing fluids, and flowback water. The oil and gas waste that will be processed by thermal unit will be waste that does not meet the liquid consistency preferred for efficient processing by the centrifuges.

1.4 Oil and Gas Waste Processing Rates

30 TAC §330.203(b) requires that the owner or operator shall determine types and an estimate of the amount of each waste to be received daily; the maximum amount of waste to be stored at any one point in time; the maximum and average lengths of time that waste is to remain at the facility; the maximum and average waste processing times; and the intended destination of the solids and liquids generated by a facility. This information is presented subsequently in Sections 2.2 and 2.5 of this plan, because these topics are more easily described after explaining the processing method and providing a list of equipment and the associated sizes/capacities.

2. DESCRIPTION OF PROCESSING METHODS

2.1 Overview of Method and Processing Sequence

Oil and gas liquid waste separation will take place using a centrifuge (two or three-phase) or a thermal unit capable of separating liquids (water and oil) and solids for subsequent management. In addition to the centrifuge(s) and thermal unit, other equipment will be used in the processing sequence. A description and list of equipment is provided subsequently in this section.

The layout of the oil and gas waste processing facility, identifying the various components, is shown on a plan view of the processing facility on Drawing IV-I-2. Once the oil and gas liquid waste is deemed appropriate for acceptance, drivers will be directed to the waste processing facility, where the oil and gas liquid waste will be processed by the following sequence of activities:

Waste Receipt

- Step 1) oil and gas liquid waste will be offloaded from tanker trucks into designated basins that may only hold oil and gas wastes (i.e., no comingling);
- Step 2A) the waste may then be solidified in the designated basins in accordance with Sub-Appendix IV-A-1 of the SOP, followed by disposal at the Class 1 waste working face once it is confirmed that the solidified waste passes the paint filter test, or Step 2B may be used instead of Step 2A;
- Step 2B) depending on its liquid consistency, the oil and gas waste may be processed at the centrifuge site or the thermal site by following their respective steps identified below.

Processing at Centrifuge Site

- Step 1) oil and gas waste to be centrifuged will be pumped from the designated basins into to the Shaker Tank for initial separation of liquid and solid material;
- Step 2) from the Shaker Tank, liquid will be transferred to the Feed Tank(s) which will be used to meter materials to the Centrifuge(s);
- Step 3) materials will be fed into the Centrifuge(s) for separation, and will be processed therein;

- Step 4) solids from both the Shaker Tank(s) and Centrifuge(s) will accumulate at the solids discharge areas into a container/box for disposal at the appropriate working face (after verifying that no free liquids are present); and
- Step 5) separated liquids remaining after initial centrifuge processing will be in two phases – water and oil. Additional centrifuging may be utilized as needed to separate oil and water. Also, a Dissolved Air Flotation (DAF) unit will be used to help separate oil and water. The separated liquid will be either transferred back to the designated oil and gas waste basins for solidification, or transferred to the appropriate tank (Recovered Water Tank or the Recovered Oil Tank) and further managed/disposed of as described in Section 2.2 below.

Processing at Thermal Site

- Step 1) oil and gas waste to be processed by the thermal unit will be transported from the designated basins into the thermal unit for subsequent heating;
- Step 2) solids will move into the Ash Cooler for cooling, and will accumulate at the solids discharge area into a container/box for disposal at the appropriate working face (after verifying that no free liquids are present);
- Step 3A) separated liquids will be condensed, and if further processing is necessary, will be transported to the centrifuge site to achieve better separation of the water and oil;
- Step 3B) if the separation of the water and oil is deemed satisfactory, the separated liquid will be either transferred back to the designated oil and gas waste basins for solidification, or transferred to the appropriate tank (Recovered Water Tank or the Recovered Oil Tank) and further managed/disposed of as described in Section 2.2 below.

2.2 Destinations of Processed Waste (Post Processing)

The destination of the processed oil and gas waste materials is as follows:

- Separated solids described as “Centrifuge Solids” will be disposed of at the Class 1 waste working face after performing the following steps:
    1. Verifying that no free liquids are present. This verification shall be made by performing a paint filter test (EPA Method 9095B) for each batch of solids.

2. Scanning for the presence of naturally occurring radioactive material (NORM) using a scintillation meter with a sodium iodide detector or equivalent. Material with a maximum reading of 50 microroentgens per hour will be further evaluated to demonstrate that the waste does not exceed 30 picocuries per gram Radium-226 combined with Radium-228 and 150 picocuries per gram of all other radionuclides following the procedures described in 25 TAC §289.259(d). Waste not meeting these requirements must be shipped off-site to a duly-permitted disposal facility that can accept this type of waste.

- The separated water-phase oil and gas waste (which is primarily a briny water) will be either: (i) solidified in accordance with Part IV, Sub-Appendix IV-A-1; (ii) managed as contaminated water as described in Part III, Attachment 15 (Leachate and Contaminated Water Plan); or (iii) transported to a duly permitted/registered off-site disposal facility (e.g., a Class II injection well) that is authorized to accept this type of oil and gas related water waste.
- The separated oil-phase material (which is primarily spent diesel used in drilling fluids, along with incidental amounts of crude oil) that is recovered from the centrifuge process will be transported to an authorized off-site oil processing/reclamation facility that is permitted or authorized to receive this type of reclaimed material.

2.3 Off-Site Transport of Post-Processed Oil and Gas Wastes

The off-site transport of the post-processed oil and gas wastes (i.e., the reclaimed oil and the separated water) shall be subject to applicable RRC requirements. For as long as these materials are within the facility's custody, the facility shall comply with all applicable RRC requirements regarding management of this waste (manifesting, recordkeeping, reporting, quantity records, verification of movement, etc.). Recovered oil and gas waste that will be transported off-site shall not be comingled with other wastes (e.g., solid waste, or non-oil and gas wastes) and will be transported and managed as required by TCEQ, RRC and TXDOT rules and requirements.

2.4 Equipment and Processing Description

2.4.1 Centrifuge Description

High-speed centrifuges are used for separation of liquids (water and oil), while simultaneously removing solid particles down to approximately 1 micron size. The centrifuging process is described below in numerical sequence (1 through 8) of the internal steps/components within the centrifuge itself.

- The liquid waste is introduced to the rotating centrifuge bowl from the top via a stationary inlet pipe (1), and is accelerated in a distributor (2) before entering the disc stack (3). It is between the discs that the separation of the liquids and the solids takes place.
- The liquid phase leaves the bowl over the top disc (4) and through a paring disc (5). The heavier solids phase is collected at the bowl periphery, from where it is discharged intermittently.
- The solids discharge is achieved by a hydraulic system below the separation space in the bowl, which at preset intervals forces the sliding bowl bottom (6) to drop down, thus opening the solids ports (7) at the bowl periphery. The bowl is mounted on a vertical spindle (8) driven by a vertically mounted motor, via a belt drive.

The centrifuge operates as a continuous process. This is done using centrifugal forces that can be well beyond 3000 times greater than gravity. When subject to such forces, the denser solid particles are pressed outwards against the rotating bowl wall, while the less dense liquid phase forms a concentric inner layer. Different dam plates are used to vary the depth of the liquid as required.

The sediment formed by the solid particles is continuously removed by the screw conveyor, which rotates at a different speed than the bowl. As a result, the solids are gradually "plowed" out of the lower part of the bowl and up the conical "beach". The centrifugal force compacts the solids and expels the surplus liquid. The dried solids then discharge from the bowl. The clarified liquid phases (water and oil) overflow the dam plates situated at the opposite end of the bowl. Manufacturer’s literature on the Centrifuges is provided in Sub-Appendix IV-I-A of this plan.

2.4.2 Description of Other Processing Equipment

Shaker Tank: This type of tank is made of steel and is used for first-stage solids control processing, to separate out larger solids prior to processing through the centrifuge. Internally, the shaker tank commonly is divided into several sub-compartments using internal plates set at different heights to separate the tank into multiple sub-compartments. The liquid waste (e.g., drilling mud) will be processed by the shaking mechanism to remove large pieces, then the separated solids will be transferred for further processing and the separated mud and/or water will drop down into a shaker sub-compartment and be transferred to the feed tank for further processing.

Feed Tank: This type of tank is made of steel and is used to meter liquids into the centrifuge for further processing.

Dissolved Air Flotation (DAF) Unit: The DAF is a tank that is used to clarify waste waters by removing suspended matter (e.g., oil). The removal is achieved by dissolving air in the water under pressure and then releasing the air at atmospheric pressure in a flotation tank. The released air forms tiny bubbles which adhere to the suspended matter causing the suspended matter to float to the surface of the water where it is then removed by a skimming device.

Recovered Water Tank: This type of tank will be made of steel will be used to receive and store the water-phase liquids that have been separated during centrifuging. These tanks may consist of vertical static tanks, mobile frac tanks or some combination up to the capacity limits shown in Table IV-I-1 and on Drawings IV-I-2 and IV-I-3.

Recovered Oil Tank: Any oil recovered through the various centrifuging, separation, and skimming processes will be placed in this type of tank, made of steel, for subsequent transportation off-site for further processing/recovery at a permitted oil waste reclamation facility. These tanks may consist of vertical static tanks, mobile frac tanks or some combination up to the capacity limits shown in Table IV-I-1 and on Drawings IV-I-2 and IV-I-3.

Other ancillary pieces of equipment will be used to effectively manage the area (e.g., washout water system tanks, transfer pumps, air compressors, etc.).

Frac Tank: This type of tank will be used either to hold washout water to clean out the trucks or tankers or to temporarily store unprocessed waste in the event that the pits are filled to capacity during times of peak receipt of incoming wastes.

2.4.3 List of Equipment and Capacity

Table IV-I-1 below provides a list of the maximum numbers of equipment and summarizes the capacity/volume of these items, the maximum number of each item, and

the resulting calculated maximum inventory of unprocessed and processed waste that may be on-site at any point in time. The facility may elect to do phase installation of these maximum numbers of equipment over time, based on the rates of incoming oil and gas waste experienced at the site and the equipment capabilities to effectively and properly manage and process the waste and conduct related operations within the required timeframes.

TABLE IV-I-1
LIST OF EQUIPMENT - OIL AND GAS WASTE PROCESSING FACILITY
COVEL GARDENS LANDFILL

ITEM	DESCRIPTION OF MAXIMUM SIZE	CAPACITY (gallons, unless noted)	MAXIMUM NUMBER OF ITEMS	TOTAL MAXIMUM WASTE HOLDING CAPACITY (gallons, unless noted)
METAL BASIN	30' X 21' X 9' (7' depth of holding capacity)	32,989	4	131,956
REINFORCED CONCRETE BASIN WITH SACRIFICIAL METAL LINING	25' X 24' X 8' (6' depth of holding capacity)	26,930	8	215,439
SHAKER TANKS	400 Barrels	16,800	2	33,600
FEED TANKS	400 Barrels	16,800	8	134,400
CENTRIFUGES	50 - 100 gpm for single phase centrifuge (with 150 gal catch tank); 150 - 250 gpm for dual phase centrifuge (with two x 90 gal catch tanks)		11	1,980
DISSOLVED AIR FLOTATION (DAF)	Trailer or skid-mounted unit with 3600 gal. tank	3,600	2	7,200
ROLL-OFF CONTAINER	40-yard Dumpster	40 cubic yards (solid material, not reported in gallons)	6	240 cubic yards
3-SIDED BOX CONTAINER	30' X 20' X 10' tall (open side, capacity smaller than full dimensions)	200 cubic yards (solid material, not reported in gallons)	1	200 cubic yards
RECOVERED LIQUID TANKS	500 Barrels	21,000	16	336,000
FRAC TANKS	500 Barrels	21,000	15	315,000
MAXIMUM COMBINED OIL AND GAS LIQUID WASTE QUANTITY AT OIL AND GAS WASTE PROCESSING AREA HELD IN TANKS/EQUIPMENT WITHIN SECONDARY CONTAINMENT AREA (gallons):				828,180
QUANTITY ESTIMATES: MAXIMUM QUANTITY OF OIL AND GAS WASTES PRESENT AT ANY ONE POINT IN TIME AT THE OIL AND GAS WASTE PROCESSING AREAS				
UNPROCESSED OIL AND GAS WASTE (basins, shaker tanks, feed tanks) (gallons):				830,395
PROCESSED OIL AND GAS WASTE - SEPARATED LIQUIDS (WATER AND OIL) (recovered liquids tanks and centrifuge catch tanks) (gallons):				345,180
PROCESSED OIL AND GAS WASTE - SEPARATED SOLIDS (box containers) (cubic yards):				440
COMBINED OIL AND GAS LIQUID WASTES (BOTH UNPROCESSED AND PROCESSED) (gallons):				1,175,575
QUANTITY ESTIMATES: OIL AND GAS WASTEWATER THAT MAY BE PRESENT IN ONE OF THE FOLLOWING ON-SITE LINED EVAPORATION PONDS AT A TIME (SEE SECTION 3.2.1 FOR PROVISIONS OF POND USAGE)				
POND C (gallons):				2,939,300
POND D (gallons):				3,823,200
POND E (gallons):				3,652,200
POND F (gallons):				3,329,200
MAXIMUM QUANTITY POTENTIALLY PRESENT AT ONE TIME IN EVAPORATION POND (I.E., THE LARGEST POND CAPACITY) (gallons):				3,823,200

Notes: (1) Centrifuge throughput is dependent on solids content and can vary widely.

2.5 Processing Rates and Waste Quantities

This section has been prepared to address the topics of 30 TAC §330.203(b), with the exception of the destination of processed waste (which were already addressed in Section 2.2). Processing rates and associated oil and gas waste quantities are estimated as follows:

- Estimated Amount of Waste to Be Received Daily.
    - Typical Day. For facility planning purposes, the facility estimates it may receive approximately 60,000,000 gallons of oil and gas waste subject to centrifuge and/or thermal processing per year. This is equivalent to approximately 164,385 gallons/day on an average (i.e., typical) day. This quantity is estimated using information on the actual quantities received during the temporary authorization (TA) period along with future market projections, and is not intended as a limiting value; the actual daily and annual quantity of liquid waste may be more or less than this estimated quantity.
    - Maximum Day. Based on the equipment capacities and allowable facility operating hours (24/7, per the SOP), the theoretical maximum amount of waste that could be received and processed in a day can be calculated. As described, the centrifuge process is a continuous process. From Table IV-I-1, at maximum operational capacity there will be up to nine centrifuges (four at each location), each with capabilities to process between 50-250 gallons/minute. The range in capabilities is due to differences in centrifuge type and the specifics of the waste composition (solids content). For practical purposes, not every centrifuge will likely be operating at maximum capacity continuously for 24 hours. Accordingly, a Maximum Day for the centrifuge site is calculated assuming (9 centrifuges x 24 hrs/day of operation x 100 gallons/minute = 1,296,000 gallons/day. Additionally, for the thermal site, there will be one thermal unit with the capacity to process about 200 tons/day
- Maximum Amount of Waste to Be Stored at Any One Point in Time in the processing facility is 833,016 gallons (see Table IV-I-1 for detailed breakdown by oil and gas waste type).
- Maximum and Average Lengths of Time that Waste is to Remain in the processing facility.

- Unprocessed Waste. Processing by centrifuge or by thermal unit is a continuous process. The maximum length of time that a given quanta of unprocessed waste will remain at the facility before processing is 24 hours. The average length of time is estimated to be 8-12 hours.
- Processed Waste. As the waste processing alternatives are continuous techniques, there will be ongoing quantities of processed waste ready for disposal at the working face, or going to the storage tanks. The maximum length of time that post-processed solids will remain at the processing facility prior to their disposal is 24 hours, and the estimated average time is 12 hours. The maximum length of time that processed liquids will be held in the storage tanks is 120 hours, and the estimated average time is 72 hours.

- Maximum and Average Waste Processing Times. It is estimated that on average, it will take 8-12 hours to process a given quanta of waste (i.e., the time for a given waste to complete the processing sequence outlined in Section 2.1). The maximum processing time is 24 hours.

3. OTHER OPERATIONAL REQUIREMENTS

This section of the Plan has been developed to address the applicable sections of 30 TAC Chapter 330 Subchapter E of the TCEQ Municipal Solid Waste Management Regulations (MSWMR) "Operational Standards for Solid Waste Storage and Processing Units." The following sections of Subchapter E are not applicable and not discussed further, because the requirements covered by these sections are for items not associated with the oil and gas waste processing facility/operations:

- 330.211 (Approved Containers);
- 330.213 (Citizen's Collection Stations);
- 330.215 (Requirements for Stationary Compactors); and
- 330.217 (Pre-Operation Notice).

3.1 Facility-Generated Wastes

The waste processing facility will separate the oil and gas waste into three phases: solid, water, and oil (i.e., petroleum products). The destination of these materials will be as discussed in Section 2.2. As noted, when the processed water from the centrifuge or thermal site is generated, it will be managed as contaminated water (in accordance with 30 TAC §330.207), as was described in Section 2.2. Also, more information on the control of contaminated water is presented below in Section 3.2.

3.2 Contaminated Water Management, Spill Prevention and Control

3.2.1 Contaminated Water Management

The facility will take the steps necessary to control and prevent the discharge of contaminated water from the oil and gas waste processing facility. Any water (e.g., stormwater, wash water) that has come in contact with waste will be managed as contaminated water and accordingly, will be handled as contaminated water in accordance with Part III, Attachment 15 (Leachate and Contaminated Water Plan). Furthermore, the processed waste water will be managed as contaminated water in accordance with 30 TAC §330.207 by following the Leachate and Contaminated Water Plan. Processed oil and gas waste water **shall not be comingled** with other waters, contaminated waters, leachate, or wastes. Oil and gas waste water will be transported to an existing on-site lined evaporation pond via dedicated tanker truck(s) (i.e., tankers not containing other contaminated waters or leachate). The oil and gas waste water will then be managed by placing it into one of either Pond C, D, E, or F (i.e., one of the

existing on-site lined evaporation ponds that will be reserved for exclusive use to hold processed oil and gas waste water only). Only one evaporation pond may be used at any one time, and all leachate and/or contaminated water must be removed from that pond prior to its use for storage of oil and gas processed wastewater. Any oil and gas waste water that is transported off-site for disposal must not be mixed with contaminated water or leachate.

Contaminated water shall not be discharged from the site without specific written TCEQ authorization. Furthermore, the oil and gas waste processing facility will be operated in accordance with 30 TAC §330.15(h) regarding the prohibition of discharges of solid wastes or pollutants into waters of the United States.

The generation of contaminated water will be minimized by a combination of site grading (to direct stormwater run-on away from and around the oil and gas waste processing facility), and earthen berms surrounding the processing facility to intercept and divert stormwater run-on from entering the areas).

3.2.2 Spill Prevention and Control (Containment)

Vehicle Unloading and Basin Secondary Containment Liner. Vehicle unloading of oil and gas waste will take place at the designated basins. The basins will be recessed below-grade and will be surrounded by a secondary containment liner composed of a minimum of 3-ft thick low permeability ($k \leq 1 \times 10^{-7}$ cm/s) compacted clay liner around the sides and bottom as shown on Drawing IV-I-5. For surface containment and control, the concrete basins have a concrete approach ramp sloped to drain into the basins. At the steel basins, the ground surface immediately adjacent to the basins where they unload will be graded to drain towards the basins. Spilled or leaked waste in and around the vehicle unloading area and basins will be cleaned up using soil or other absorbent material/solidifying agents to remove free liquids, followed by disposal in the landfill.

Centrifuge Site and Thermal Site – Secondary Containment Liner. As shown on Drawings IV-I-2 through 5, the centrifuge site and the thermal site will have a secondary containment liner surrounding the floor and sides of the area, composed of either concrete or compacted clay liner. The secondary containment liner is sized according to the following design criteria (whichever is greater):

(i) the volume of the 25-year, 24-hour storm plus the volume of the largest storage container; or
(ii) the volume of the 25-year, 24-hour storm plus 10% of the combined volume of all the containers within the contained area.

For reference, the 25-year, 24-hour storm is 7.8 inches (taken from the facility storm water management calculations in Part III, Attachment 6 of the permit; the source of which is from National Weather Service Technical Paper Number 40 (TP-40) data for Bexar County). The secondary containment liner area will be sloped to drain to a low-point (sump), to allow for collection and removal of spilled or leaked waste and to prevent overflow of the containment. Spilled/leaked waste or contaminated water must be removed from the secondary containment system within 24 hours. Spilled or leaked waste will be cleaned up using soil or other absorbent material/solidifying agents to remove free liquids, followed by disposal in the landfill.

Compacted Clay Quality Control/Quality Assurance (QA/QC). The QA/QC procedures, specifications, and requirements for the compacted clay liner secondary containment surrounding the basins and when used as secondary containment for the centrifuge site or the thermal site will be performed in accordance with the applicable sections of the Soils and Liner Quality Control Plan (SLQCP) – refer to Drawing IV-I-4 for details.

3.3 Storage Requirements at the Oil and Gas Waste Processing Facility

The facility will not accumulate waste (both unprocessed and processed) in quantities that cannot be managed in a timely manner as set forth below. Additionally, the facility will not accumulate these wastes for such time as to cause the creation of odors, insect breeding, or harborage of other vectors. Care shall be taken such that the storing of waste does not constitute a fire, safety, or health hazard or provide food or harborage for animals and vectors. Maximum allowable storage times are as follows:

- Unprocessed waste to be centrifuged will not be stored for more than 24 hours.
- The maximum length of time that post-processed solids will remain at the oil and gas waste processing facility prior to their disposal is 24 hours;
- The maximum length of time that post-processed liquids will be held in the storage tanks is 120 hours.

3.4 Fire Protection

The fire protection procedures that shall be followed are as follows:

- Follow the General Fire Prevention methods described in Section 6.2 of the SOP.

- In the event of a fire, follow the General Fire Fighting Procedures described in Section 6.3 of the SOP.
- In addition to the General Fire Fighting Procedures, in the event of a fire at the oil and gas waste processing facility , assess the extent of the fire and the potential for the fire to spread, and take appropriate action to contain/extinguish the fire as follows:
    - Smother the fire with soil transported by a dump truck, bulldozer, or other available equipment;
    - Apply water using a water truck or hose;
    - Use a fire extinguisher; or
    - If a fire cannot be extinguished by on-site facility personnel, the local fire department may be contacted by telephoning 911.

3.5 Subchapter E Requirements Addressed in SOP

The following Subchapter E requirements shall apply to oil and gas waste processing facility, and are addressed in the facility's SOP (with reference to the relevant section of the SOP noted).

- Access Control – See Section 7 of the SOP;
- Unloading of Waste – See Section 8.5 of the SOP;
- Operating Hours – See Section 9 of the SOP;
- Facility Sign – See Section 10 of the SOP;
- Control of Windblown Material and Litter – See Section 11 of the SOP;
- Materials Along the Route to the Facility – See Section 14 of the SOP; and
- Facility Access Roads – See Section 18 of the SOP.

3.6 Noise Pollution and Visual Screening

Overall screening features at the Covel Gardens facility are presented in Section 29 of the SOP. The oil and gas waste processing facility will initially be located in a portion of the site (see Drawing IV-I-1) that is a substantial distance from public roads and that

will be screened by the existing landfill. If/when the facility is relocated, it will be to other appropriately lined landfill areas (as noted on Drawing IV-I-1), and the resulting set-back from the permit boundary and public roads will serve to screen the operations and minimize adverse visual and noise impacts.

3.7 Overloading and Breakdown

In the event that equipment of critical importance associated with the centrifuge site or thermal site breaks down or is otherwise unavailable, equipment with equivalent performance that is performing a non-critical function may be temporarily reassigned to the critical function until the primary equipment is repaired. If a significant work stoppage of centrifuge or thermal processing occurs and is anticipated to last long enough to exceed the allowable storage times, create objectionable odors, insect breeding, or harborage of vectors, the situation will be remedied by processing the waste by the solidification technique (Appendix IV-A of the SOP); alternatively, the waste may be diverted to another approved processing or disposal facility.

3.8 Sanitation

When in use, the oil and gas waste processing basins are recommended to be washed down on an annual basis in conjunction with the basin inspections discussed subsequently in Section 3.12.1. During times when processing equipment is operating on a continuous basis, the processing area will be kept tidy by sweeping the floor areas and washing down the equipment to maintain sanitary conditions. Wash water which will drain to the low spot (sump) within the secondary containment area (see Drawing IV-I-4 and IV-I-5) will be removed in a timely manner and collected and disposed of in an authorized manner.

3.9 Ventilation and Air Pollution Control

No significant odors or air pollution emissions are expected to result from the oil and gas waste processing facility based on experience during the previous year's operation and the operational techniques that will be employed. The continuous process of liquids processing and removal are expected to minimize the chance for "stagnation" of liquid and any odors that could result. Care shall be taken to minimize fugitive dust from the area. Also, the various tanks associated with the process are enclosed, which will prevent the escape of odors. If nuisance odors from processing operations are detected at the facility permit boundary, the site will immediately take action to abate the

nuisance, for example, by making the processing of those liquids the immediate priority in order to alleviate that odor.

3.10 Health and Safety

Training requirements of site personnel are discussed in Section 5.4, of the SOP. This includes training on health and safety topics.

3.11 Employee Sanitation Facilities

Potable water and sanitary facilities are provided for all employees and visitors within the office building at the site. Additional facilities may be added to the oil and gas waste processing facility for the convenience of site personnel and visitors.

3.12 Inspections, Recordkeeping, and Reporting Requirements

3.12.1 Waste Recordkeeping

Incoming wastes associated with the oil and gas waste separation facility will be subject to the testing and recordkeeping requirements set forth in the RRC Permit Conditions II.B and III.

For separated solids that are disposed of in the landfill, the results of the testing required in Section 2.2 of this plan (showing passing results) will be documented and maintained in hardcopy or electronic format as part of the Site Operating Record for a minimum period of three years as described in the RRC permit.

3.12.2 Oil and Gas Waste Processing Facility Inspections

Basins: At least once per month, the Site Manager or designated alternate will conduct a visual inspection of the basins to check for holes, cracks, gaps, spalls, or other signs of damage, and if found to be significant enough to potentially compromise the structural integrity of the basin, the basin will not be used until repairs are made. Once per year, a more thorough inspection of the basins will be made by emptying each basin and visually inspecting the walls and floor.

Secondary Containment: At least once per month, the Site Manager or Designated alternate will inspect the secondary containment (concrete or earthen liner as described

in Section 3.2.2) surrounding the centrifuge site and thermal site to verify the integrity, ensure that controls are in place, and that housekeeping is adequate.

Processing Equipment: At least once per month, the Site Manager or designated alternate will conduct a visual inspection of the centrifuge(s), thermal unit, associated processing equipment, and the storage tanks. The purpose of the visual inspection will be to ensure no leaking valves or connections exist in the equipment.

If the results of any of the above inspections reveal non-compliances or problems with the function of the equipment/feature, corrective action shall be promptly taken to remedy/repair the issue and restore adequate function and compliance of the area operations.

3.12.3 Recordkeeping, Reporting, and Notification Requirements

The results of the inspections described herein will be documented in writing and placed in the Site Operating Record.

Also, TCEQ shall be notified in writing at least 30 days prior to relocation of the oil and gas waste processing facility. The notification will include an updated Drawing IV-I-1 or equivalent plan of the site, to show the new location.

4. CLOSURE

4.1 Oil and Gas Waste Processing Facility Closure Activities

When it is time to close the oil and gas waste processing facility, any remaining unprocessed waste will be processed at the centrifuge site or the thermal site, or solidified in the designated basins as needed to pass the paint filter test and transported to the landfill for disposal. Then the equipment, basins, and any concrete surfaces will be washed down to clean them. The wash waters shall be collected and disposed of in an authorized manner. Rented/leased items will be removed from the site and returned to the vendors/Lessors. Items having market value/salvage value (e.g., recovered oil, metal basins) will be removed from the site and the sale proceeds used to offset closure expenses.

Mixing basins will be either: (i) removed and sold for salvage value; (ii) removed and disposed of in the landfill; or (iii) remain in-place and will be filled with clean inert backfill soil to grade level. As discussed, the facility will be located on waste which will be capped and closed in accordance with landfill closure procedures.

4.2 Closure Scenarios and Waste Inventory at Closure

For expected scenario at the facility, termed “routine” (a.k.a., “planned”) closure, the facility will stop receiving oil and gas waste and processing prior to closure. Therefore, for the routine closure scenario, the liquid waste inventory at the time of closure will be zero. The worst-case scenario would be unplanned closure, if the facility were to close at an unforeseen time and has an inventory of processed and unprocessed oil and gas waste at the site. For this worst-case scenario, the estimated quantities were presented in Table IV-I-1, and will be used as the basis of quantities for the most expensive oil and gas waste processing facility closure cost estimate.

4.3 Closure Cost Estimate

A detailed cost estimate in current dollars, for hiring a third party to close the oil and gas waste processing facility, for the worst-case scenario when closure would be most expensive, is presented in Table IV-I-2 below.

TABLE IV-I-2
CLOSURE COST ESTIMATE - OIL AND GAS WASTE PROCESSING FACILITY
COVEL GARDENS LANDFILL

ITEM No.	DESCRIPTION	UNIT	UNIT COST	QUANTITY	TOTAL COST
1	Engineering				
1.2	Contract Administration, Bidding and Award	L.S.	$4,000	1	$4,000
1.3	Administrative Costs	L.S.	$3,000	1	$3,000
				ENGINEERING TOTAL	$7,000
2	Closure Construction Activities (dispose of unprocessed waste, decon, remove equipments)				
2.1	Mobilization & Demobilization of Contractor	L.S.	$10,000	1	$10,000
2.2	Off-Site Disposal of Processed Oil/Gas Waste Water	Gal.	$0.10	261,180	$26,118
2.3	Sale of Processed Oil (proceeds will offset other closure costs)	Gal.	$0.00	60,000	$0
2.4	Solidification of Unprocessed Liquid Waste	C.Y.	$2.50	8,223	$20,557
2.5	On-Site Disposal of Solidified Waste (haul to working face)	C.Y.	$2.00	8,223	$16,446
2.6	On-Site Disposal of Solid-Fraction Processed Waste (haul to working face)	C.Y.	$2.00	440	$880
2.7	Decontamination (Wash Basins, Equipment, and Containment Area). Off-Site Disposal of Wash Waters.	L.S.	$5,000	1	$5,000
2.8	Re-Sale Value of Equipment (proceeds will offset other closure costs)	L.S.	$0	1	$0
2.9	Salvage Value of Metal Basins (proceeds will offset other closure costs)	L.S.	$0	1	$0
2.10	In-Place Closure of 4 x 150 CY Concrete Basins (Backfill with Soil)	C.Y.	$2.50	600	$1,499
2.11	Revegetate Fixed Facility Disturbed Area (half of 375' x 550')	Ac.	$1,500	2.4	$3,551
				CONSTRUCTION TOTAL	$84,051
				ENGINEERING AND CONSTRUCTION TOTAL	$91,051
3	Contingency, Contract, and Legal				
3.1	Contingency (10% of Eng and Construction)				$9,105
3.2	Contract Performance Bond (1% of Eng and Construction)				$911
3.3	Legal Fees (15% of Eng and Construction)				$13,658
3.4	TCEQ Administration Cost (5% of Eng and Construction)				$4,553
				CONTINGENCY, CONTRACT, LEGAL TOTAL	$28,226
	TOTAL LIQUID WASTE SOLIDIFICATION AREA CLOSURE COST				**$119,277**

Above costs are in 2014 dollars. Oil and Gas Waste Processing Facility Closure Cost on this Table shall be added to the other facility Closure Costs - See Part III, Attachment 8.

Notes for Table IV-I-2:

Assumptions and Cost Backup:					
Closure is "premature" (i.e., unplanned) which is most expensive [because under routine planned final closure at the end of the facility life, the oil and gas waste processing facility will cease accepting oil and gas liquids and dispose of materials before the start of closure]					
Maximum inventory of wastes assumed as follows (based on Table IV-I-1):					
	Unprocessed Oil and Gas Waste (gallons):			830,395	
	Processed Oil and Gas Waste - Separated Liquids, Water-Phase (gallons):			261,180	
	Processed Oil and Gas Waste - Separated Liquids, Oil-Phase (gallons) (4 tanks full @ 21,000 gal/tank):			84,000	
	Processed Oil and Gas Waste - Separated Solids (cubic yards):			440	
	Assumed Solidification Bulking Factor:			2.0	
	Quant of Solidified Mat'l for On-Site Disp (i.e., unprocessed vol x bulking factor; converted to cubic yards):			8,223	
Basis for unit rates for off-site disposal is based on Facility experience. Basis for unit rates for "conventional" construction items (involving soil & waste, revegetation) is based on experience from similar construction projects.					
Item 2.2. The facility is currently paying $0.077/gal to transport and off-site dispose of the processed water. This was rounded up 23% to an even $0.10/gal.					
Item 2.3. The current price the facility receives for recovered procesed oil is $75.20/barrel, or $1.79/gallon. (1 bbl = 42 gallons) Even though the material inventory is based on having the oil tank completely full (21,000 gallons), to be conservative, this quantity was reduced. Furthermore, in accordance with TCEQ's request, it is conservatively assumed that the recovered oil has no market value at the time of third-party closure.					
Item 2.4. Basis for Solidification Unit Rate: Solidification on-site soil needs are 2500CY @ $2.00/CY = $5000. Mixing Needs: 1 Excavator + 1 Loader can solidify 2000 CY/day. Round up to 3 days total time. From RS Means Construction Cost Data, typical heavy equipment operator rate = $350/day. 1 CY Loader = $380/day. 3 CY capacity excavator = $1275/day. Solidification Cost = $5000 material + [3 days x (2 operators x 350/day) + $380/day + $1275/day)] = $12,065. Expressed on a CY basis, $12065/4834CY = $2.50/CY Unit Rate.					
Item 2.7. Basis for Decontamination Costs. Pressure washing unit rates from RS Means Construction Cost Data = $0.04/S.F. For simplicity, the estimated square footage to be decontaminated (basins, concrete slab, above-ground equipment) assumed as the equivalent of 50,000 S.F. (conservative - equivalent of more than one acre of pressure washing). Pressure washing cost = 0.04 x 50,000 S.F. = $2000. Assume 10,000 gallons of wash water generated, and off-site dispose of at $0.30/gallon (conservatively assume triple the unit rate of disposing processed water off-site) = $3,000. Total = $5,000.					
Item 2.8. For worst-case (most expensive) cost estimate, assume all equipment is leased, not owned. Therefore, salvage cost = $0 (i.e., return to Lessor). If equipment is owned, it will have substantial market Re-Sale Value.					
Item 2.9. Metal Basin Salvaging. Typical market pricing of scrap metal (ferrous plate steel scrap) at a scrap yard = $0.05 to 0.10/lb. Therefore it is likely that the scrap basins can be sold and the proceeds could offset closure costs. However, in accordance with TCEQ's request, it is conservatively assumed that the basin scrap metal has no market value at the time of third-party closure (i.e., the salvage value is $0).					
Item 2.11. Basis for revegetation: the disturbed area of the waste processing facility is approximated to be half the total area. Mechanical seeding unit rate from RS Means Site Work & Landscape Cost Data = $1250/acre. This was rounded up 20% to $1500/acre.					