

Hugo CCR Landfill Post-Closure Plan



Western Farmers Electric Cooperative

Project No. 85009

Revision 0
October 14, 2016

Hugo CCR Landfill Post-Closure Plan

Prepared for

**Western Farmers Electric Cooperative
Project No. 85009
Hugo, Oklahoma**

**Revision 0
October 14, 2016**

Prepared by

**Burns & McDonnell Engineering Company, Inc.
Kansas City, Missouri**

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INDEX AND CERTIFICATION

Western Farmers Electric Cooperative Hugo CCR Landfill Post-Closure Plan

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Certification

I hereby certify, as a Professional Engineer in the state of Oklahoma, that the information in this document was assembled under my direct personal charge. I am a “Qualified Professional Engineer” as defined by 40 C.F.R. § 257.53 by the fact that I have the technical knowledge and experience to make the specific technical certifications set forth herein. This Post-Closure Plan meets the requirements of 40 C.F.R. § 257.104. This Post-Closure Plan is not intended or represented to be suitable for reuse by Western Farmers Electric Cooperative or others without specific verification or adaptation by the Engineer.

Robert N. Owens P.E. (No. 21260)

Date: _____

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LIST OF ABBREVIATIONS

<u>Abbreviation</u>	<u>Term/Phrase/Name</u>
ALM	Asset Life Management
BMcD	Burns & McDonnell
CCR	Coal Combustion Residual
C.F.R.	Code of Federal Regulations
CMMS	Computerized Maintenance Management System
EPA	Environmental Protection Agency
ESP	Electrostatic Precipitator
FGD	Flue Gas Desulfurization
NAVD 88	North American Vertical Datum of 1988
NGVD 29	National Geodetic Vertical Datum of 1929
OAC	Oklahoma Administrative Code
ODEQ	Oklahoma Department of Environmental Quality
RCRA	Resource Conservation and Recovery Act
SAP	Sampling and Analysis Plan
USC	United States Code
USGS	United States Geological Survey
WFEC	Western Farmers Electric Cooperative

1.0 INTRODUCTION

Burns & McDonnell (BMcD) has compiled information and prepared this Written Post-Closure Plan (Plan) for the existing CCR Landfill (Landfill) at the Western Farmers Electric Cooperative (WFEC) Hugo Power Plant (Plant). The purpose of this Plan is to comply with the United States Environmental Protection Agency's (EPA) Coal Combustion Residual Rule (CCR Rule), and the counterpart rules of the Oklahoma Department of Environmental Quality (ODEQ).

On April 17, 2015, EPA published the CCR Rule relating to the disposal of coal combustion residuals (CCR) materials generated at electric utilities' coal-fired units. The CCR Rule was promulgated pursuant to the Resource Conservation and Recovery Act (RCRA, 42 U.S.C. §§ 6901 *et seq.*), using the Subtitle D approach and is found at 40 C.F.R. § 257.50 *et seq.* Additionally, ODEQ adopted counterpart regulations to the CCR Rule effective September 15, 2016, which are found at OAC 252:517.

The owner or operator of a CCR Landfill subject to the CCR Rule must provide Post-Closure care for CCR units which are closed by leaving CCR in place (40 C.F.R. § 257.104(b)). Owners or operators of a CCR Landfill must compile a Post-Closure Plan in accordance with 40 C.F.R. § 257.104(d)(1) and OAC 252:517-15-9-(d)(1). This Plan provides the required information for the Landfill at the Plant. The Post-Closure Plan must contain the following per §257.104(d)(1):

- A description of post-closure care maintenance activities (and frequency of these activities) including the following:
 - Maintaining the integrity and effectiveness of the final cover system, including making repairs to the final cover as necessary to correct the effects of settlement, subsidence, erosion, or other events, and preventing run-on and run-off from eroding or otherwise damaging the final cover.
 - Maintaining the groundwater monitoring system and monitoring the groundwater in accordance with the requirements of 40 C.F.R. § 257.90 through 40 C.F.R. § 257.98.
- The name, address, telephone number, and email address of the person or office to contact about the facility during the post-closure care period.
- A description of the planned uses of the property during the post-closure period.
 - Post-closure use of the property shall not disturb the integrity of the final cover, liner(s), or any other component of the containment system, or the function of the monitoring system unless necessary to comply with 40 C.F.R. § 257.104 or if the owner or operator of the

Landfill demonstrates that the disturbance (including any removal of CCR) will not increase the potential threat to human health or the environment.

2.0 POST-CLOSURE PLAN

2.1 Landfill Description

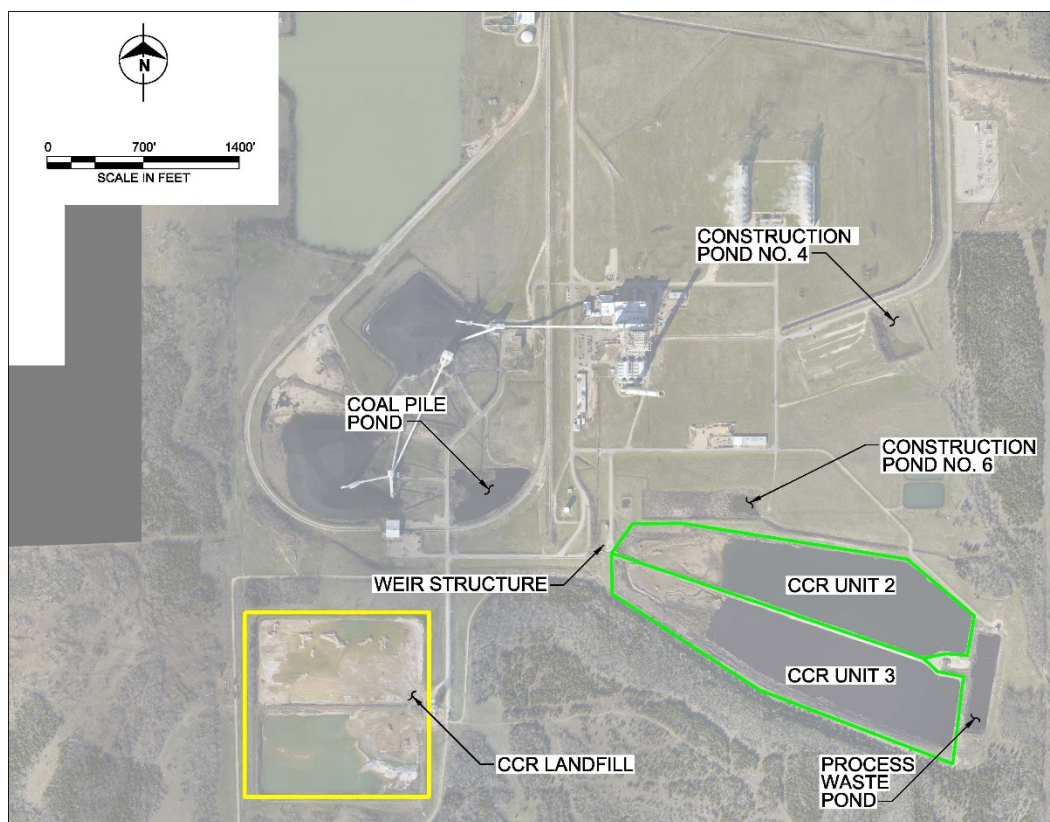
The Plant is a single, coal-fired unit rated at 450 MW. The Plant is located south of highway US-70, west of the Town of Fort Towson, Oklahoma, and is owned and operated by WFEC. Bottom ash is available for beneficial reuse and managed in two cells of the Plant's CCR surface impoundment. Fly ash and economizer ash generated by the Plant are beneficially reused or managed in an on-site Landfill as described below.

Fly ash is pneumatically transported from the electrostatic precipitator (ESP) and stored temporarily in silos during normal operations. Fly ash is unloaded directly from the silo and sold for beneficial use. The remaining portion of the fly ash is placed in the on-site Landfill where it is managed or later excavated for sale as beneficial use. Fly ash is conditioned at the Landfill with water when unloading.

The Landfill is a special waste landfill registered with the State of Oklahoma. The Landfill is located on the west side of the Plant and is divided into two cells. See Figure 2-1 for a Site Plan.

A Modification to the Closure/Post-Closure Plan was prepared by Guernsey, and is included in Attachment A. The Landfill will be closed and capped in place as described in the Closure Plan and in accordance with the CCR Rule. The Closure Plan includes maximum grades and other drainage features to reduce run-on and runoff from eroding and otherwise damaging the final cover.

Figure 2-1 Hugo Site Plan



2.2 Post-Closure Compliance

Post-closure maintenance will be as described in 40 C.F.R. § 257.104(b) of the CCR Rule. This Section includes requirements for maintenance and inspection of the final cover system and groundwater monitoring activities for a period of 30 years.

2.3 Description of Post-Closure Activities

Final cover inspection and maintenance will be conducted for a period of 30 years after the completion of closure of the Landfill. Inspection and maintenance activities will be monitored during annual inspections that will occur throughout the post-closure care period. Inspection activities are discussed further in Section 2.3.2. Groundwater monitoring will occur separate from the annual inspections and will be as described herein. If, at the end of the 30-year post-closure care period, the Landfill is operating under an Assessment Monitoring Program in accordance with 40 C.F.R. § 257.95, the Plant will continue to conduct post-closure care until the Landfill returns to the Detection Monitoring Program in accordance with 40 C.F.R. § 257.95.

2.3.1 Groundwater Monitoring

The Plant will conduct sampling of the Landfill groundwater monitoring network per 40 C.F.R. § 257.90 through 40 C.F.R. § 257.98 of the CCR Rule for the entire 30 years of post-closure care. Should any of the sampling activities cause the Landfill to enter into an Assessment Monitoring Program at the end of the 30-year post-closure care period, the Plant will continue monitoring the groundwater until the Landfill is able to return to a Detection Monitoring Program per 40 C.F.R. § 257.95. Sampling for compliance with the CCR Rule will be performed according to the Sampling and Analysis Plan (SAP) for groundwater monitoring at the Landfill.

2.3.2 Site Inspections and Repair

Site inspections will be performed annually during the post-closure care period to confirm that the integrity and effectiveness of the final cover system is maintained per 40 C.F.R. § 257.104(b)(1). Maintenance of the final cover will include making repairs to the final cover as necessary to correct the effects of settlement, subsidence, erosion, or other events, and preventing run-on and run-off from eroding or otherwise damaging the final cover. During the site inspections, the Plant will also inspect groundwater monitoring wells to confirm that they are operable in accordance with the Groundwater Monitoring Plan.

2.4 Post-Closure Contact

The Plant will designate and list a contact person during the post-closure care period per 40 C.F.R. § 257.104 (d)(ii). The following individual will be the Plant’s designated contact person for post-closure care at the Landfill:

Name	Kent Fletcher
Affiliation	Environmental Coordinator Western Farmers Electric Cooperative
Address	P.O. Box 429 701 NE 7th Anadarko, OK 73005
Phone No.	(405) 247-4298
Email	k_fletcher@wfec.com

2.5 Use During Post-Closure Care Period

The Landfill will not be utilized for any purpose, but will be maintained as grassland during the post-closure care period. Such use and maintenance will not disturb the integrity of the final cover system or

the groundwater monitoring system. The Landfill is located within a secured power plant facility, and will only be accessed during inspection and groundwater monitoring activities.

2.6 Completion of Post-Closure Care

Following the completion of the post-closure care period, a notification verifying that post-closure care has been completed will be prepared and placed in the Plant's Operating Record in accordance with the CCR Rule. The notification will include a certification by a qualified professional engineer in the State of Oklahoma that post-closure care has been completed in accordance with the written Closure Plan in effect and the requirements of 40 C.F.R. § 257.104.

3.0 REVIEW AND REVISIONS

This Plan will be placed in the Plant's Operating Record in accordance with the CCR Rule. Pursuant to the CCR Rule, if there is a significant change to any information compiled in the Plan, the relevant information will be updated and the revised document will be placed in the Plant Operating Record with notice and public accessibility as required by the CCR Rule. A record of revisions made to this document is included in Section 4.0

ATTACHMENT A – MODIFICATION TO THE CLOSURE/POST CLOSURE PLAN

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RECEIVED

APR 19 1999

WESTERN FARMERS
ELECTRIC COOPERATIVE
HUGO PLANT

Western Farmers Electric Cooperative
Anadarko, OK



GUERNSEY

ENGINEERS

ARCHITECTS

CONSULTANTS

PRELIMINARY
DRAFT

MODIFICATION TO THE CLOSURE/POST CLOSURE PLAN

FLY ASH PONDS 1 AND 2
HUGO GENERATING PLANT

HUGO, OK

APRIL 14, 1999

**Western Farmers Electric Cooperative
Anadarko, OK**

PRELIMINARY
DRAFT

MODIFICATION TO THE CLOSURE/POST CLOSURE PLAN

**FLY ASH PONDS 1 AND 2
HUGO GENERATING PLANT**

HUGO, OK

APRIL 14, 1999

**Western Farmer's Electric Cooperative (WFEC)
Modified Closure Plan
Hugo Generating Plant**

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**Part I - Closure Plan
(Modified)**

1.0 Introduction

Western Farmer's Electric Cooperative (WFEC) has obtained the services of C. H. Guernsey & Company (GUERNSEY) to review and modify the Closure/Post Closure Plan (PLAN) originally submitted in November, 1993 for the Fly Ash Ponds 1 and 2 at the Hugo Generating Plant in Hugo, OK (SITE).

This modification to the PLAN will further define the time required to fill the ponds and begin closure for them. All of the State and local requirements from the original plan remain in effect. This modification will also provide the appropriate reviewing agencies with the change in operational situations that are being considered by WFEC.

All applicable regulations have been reviewed and remain in effect concerning the PLAN. The purpose of the modification is to evaluate the financial exposure WFEC is required to maintain concerning closure activities and make recommendations to assist in minimize that financial exposure. This modification will further define the time required to fill the ponds and begin the actual closure process.

Another purpose of this modification is to take advantage of the opportunity to fill one of the ponds and begin the closure process. It is WFEC's intention to now close the ponds one at a time to make available the required area and to minimize the amount of financial assurance required to maintain the bond for the closure plan.

In January 1995 WFEC requested that GUERNSEY investigate the idea to close or partially close one of the ponds, thereby reducing the amount of financial assurance required to maintain the closure plan. After a lengthy investigation, the following questions were developed to determine the existing conditions concerning the ponds. Answers to these questions would assist in determining the feasibility of the partial closure.

1. Are both ponds currently being utilized?

Information from the plant indicates that the North pond is approximately 60 per cent filled with the South Pond being approximately 20 per cent filled.

2. Could one pond be closed at a time?

According to David Smit at the Oklahoma Department of Environmental Quality (ODEQ), this can be accomplished with a modified plan.

2. Could possibly one end of one pond and then the other end followed by the last pond?

While it is not specifically spelled out here, it was indicated in the PLAN that this was the intended course of action. However, post closure activities, such as monitoring and maintenance would require a significant amount of coordination to maintain proper closure.

3. If only one pond is being used, is it possible to remove any ash from the other pond to the one currently being used?

This is a viable solution to minimize the time required to fill one pond and close it out. However, the cost to relocate the existing material could be prohibitive.

4. Is water being utilized in the ponds or is the material being placed dry?

According to the information received, it is apparent that the material is being placed in a dry state.

5. If it is being placed dry, is there a need for the water in the pond? Also, is there a need for the ponding head device?

There is not a significant need for water in the pond. The drainage system must be installed to allow for runoff to leave the pond during the life of the pond.

6. If the material is being placed dry and approval for the idea could be obtained, could the material in one pond be mounded to a depth of 6 - 8 feet above the top of the dike and immediately covered with top soil and establishing vegetation?

To properly close the pond, the final cover material must be placed over the fly ash. This must be placed between the topsoil and the fly ash material. In addition, to ensure proper drainage of the cover surface, a 2.0 per cent slope must be maintained for the cover. Due to the width of the pond, the actual rise from the edge of the pond to the center is 6.28 feet. However, the design for closure provides for the material at the edges of the pond to be within no more than 3 feet of the top of the dike. Therefore the material will only rise above the top of the dike a total of 3.28 feet.

7. Using the same idea in item 6, could the West end of one pond be closed out (say 60 - 80 feet) at a time?

Yes, it can, but again, the final cover material should be placed and compacted over the fly ash to consider it being "closed out". In addition, the monitoring required during post closure could interfere with existing placement operations. If say 80 feet of the west end of one pond is closed out, then the volume of cover that would

contain the material would be 2.5 feet thick times 20 feet high times 700 feet wide. This results in a volume of 1300 cubic yards in the pond that could be utilized for ash storage. If you broke up the pond into 80 foot lengths and applied cover at each "closure", you would use approximately 19,000 cubic yards of available storage space with cover material.

8. Approximate length of time required to fill a pond? Previous estimates have a range of approximately 20 years. Some additional time estimates are included in this study and some of the factors which played into the establishment of these estimates are
- Current plant contractor has maintained a 10" balance on placement of ash into the pond. This is due to 100 per cent sales of the material.
 - What level of performance will be achieved (or maintained) by the successive contractor(s), and
 - How or what effect changes in the state or federal regulations will have on the use of the material.

The answers to these questions are used to further refine the recommendations previously made in the PLAN.

2.0 Pond Utilization

Currently, there is no material being placed in the ponds. Existing contracts project 100 per cent sale of the material until the end of year 2001. At that time, 100 per cent of the material could possibly be deposited in the ponds.

The volume of storage in each pond is calculated to be 544,822 cubic yards. This includes the prismatic area located above the horizontal plane 3 feet below the top of the dike. The volume of storage available in this area above the level top of the pond is approximately 54,532 cubic yards per pond. With the information obtained, it was determined that an average monthly placement of material is approximately 4,843 cubic yards per month. Therefore, a pond, starting at empty, would take 12.5 months or 9.4 years to fill.

If indeed the North Pond is filled first, it would only take 51.7 months or 4.3 years. That would mean the closure sometime in early 2006. Then the South Pond would be filled beginning with approximately 93,000 cubic yards of material already placed. That would leave 446,822 cubic yards available and it would take 92.3 months or 7.7 years at the calculated average rate of placement of 4,843 cubic yards per month. The South Pond would then be filled sometime in early 2013.

If the volume of the existing material already deposited in the South Pond were removed and placed in the North Pond, that would reduce the time to closure by 20 months, or 1.7 years. This would allow the North Pond to be closed in the year 2004. However, the cost of moving the existing

material from the south pond to the north could outweigh any potential savings gained in the depositing of the financial assurance.

If placement of the material were diverted to the south pond, it would allow the drainage system as designed to remain in place and allow for removal during the closure operations. The rate of deposit was calculated to be 4,843 cubic yards per month. With that rate, closure of the first pond (south) would take approximately 92 months, or 7.6 years to complete (year 2002). If the material in the North Pond were moved to assist in filling the South Pond, then the time would be shortened to 31.5 months or 2.6 years (2004).

Actually, the volume of material is wholly contained within the dike itself as the top of the cover will be equal to the top elevation of the existing dike. The fly ash material can indeed be mounded above the top of the dike, however, a maximum of 2 percent grade should be maintained on the cover to minimize erosion of the cover material. Therefore, the total height of the material above the level top can only be half the width of one pond ($546/2 + 40.23 = 313.23'$) times the grade (2.0%) or 6.26 feet. With the cover being 3 feet deep, this will project the fly ash mound approximately 3 feet above the top of the dike.

3.0 Drainage

In the PLAN, it was recommended that the South Pond (No. 2) be closed first, either all at once, or in phases, followed by the North Pond (No. 1) in the same manner. The closure drainage system was designed to accommodate this sequence of closure.

However, information from the plant indicates that the North Pond is approximately 60 per cent filled with the South Pond being approximately 20 per cent filled. Therefore, the north pond is currently closed to being filled. If the North Pond is to be closed first, the drainage system as designed will require modification.

If the drainage system as recommended in the plan has already been installed, then a modification to this location should be implemented before continuing with placement of material in the North Pond. This modification will consist of re-routing the piping to the east and collecting along the north to intercept the outfall at the NE corner of the North Pond. This will require an additional 790 lineal feet of 24 inch diameter CGMP pipe, and two Manhole/Junction Boxes. In addition, the excavation for the piping will be significantly deeper and will cost more. Also, the existing piping under the ponds (between the inlets) should be removed. It is called to be demolished at closure anyway, so this would be a good time to remove the piping. The total additional cost to modify the system already installed is \$60,000. See Appendix B for cost estimates for the various alternatives.

If the drainage system has not yet been installed, the location of the piping can be modified such that the collector piping does not run under the ponds from South to North, but instead is installed along the east edge of the pond dike. At closure of either one of the ponds, the drain for that pond may be

removed without affecting the performance of the other pond and the collector pipe along the edge of the pond may be abandoned in place. The estimated cost for this modification is \$20,100.

4.0 Final Cover and Surface Drainage

The intent to fill either pond first, thereby allowing partial closure, will require some coordination. To adequately drain the area above the ponds, a minimum of a 2% slope should be maintained to ensure that all surface water runs off the pond area. However, greater than a 2% slope could result in erosion of the final cover material. Therefore, to close out one pond and allow for the maximum storage of fly ash, the surface of the cover material should maintain a 2.0 percent slope in all directions. This is somewhat a problem on the side of the pond nearest the center dike. If the pond is mounded in the middle and drains to both sides, the runoff towards the dike would have to be intercepted and diverted away from the other pond. Therefore, a drainage piping system would be required to divert the water away from the dike area. This system could be installed in the trench currently occupied by the distribution piping in the center dike. Since this system is no longer in use, and it to be removed as a part of closure, we recommend the interim drainage piping be constructed in this location.

To allow for adequate drainage when both ponds are closed, additional cover material is required to provide minimal slope for storm water runoff above the ponds. In the original intent to close the ponds together, it was intended to mound the material above both ponds, thereby allowing for material to be deposited above the dike area. However, in closing one cell at a time the final cover must be in place to consider the pond closed. Therefore, it would not be feasible to consider the area above the top of the dike as viable storage. Upon closure of both ponds, it would be advisable for the proposed drain pipe to be removed and sufficient final cover material added in this area to facilitate overbank or channel drainage.

The efforts to close the North Pond first would surely reduce the cost of the assurance sooner, but if indeed the drainage piping is already installed, it should be modified, and removed from under the pond prior to continuing with the material placement. A recommended modification is shown on Sketch C-1 in Appendix C.

Sill Costs

The quoted costs for closure of both ponds at one time, based on the closure plan of 1993, is calculated to be approximately \$3,654,843. This cost is in 1999 dollars.

The total cost for closing the either Pond first is estimated to be \$1,991,801. This does not include any modification to the existing drain system. If the system has not yet been installed, it may be modified prior to installation to accommodate both ponds. The additional cost to modify the system from that already presented is approximately \$20,100. This includes the addition of two junction

manholes and the additional excavation required to locate the piping out from under the ponds.

If the drainage piping has already been installed, then it must be amended as shown on attached sketch C-1. If indeed it has been installed, then the additional cost to modify the drainage system will be approx. \$60,000.

Close the South Pond first. To close the south pond first will more closely follow the original plan and will not require any modification to the drainage system as originally designed. However, the volume of existing material already placed in the north pond is of such magnitude that it would financially be more conducive to concentrate storage efforts on the North Pond. If indeed the North Pond is to be the first to be closed, then the question is whether or not it is conceivable to relocate the existing material in the South Pond to the North Pond. The cost for moving the material is estimated to be approximately \$1.10 per cubic yard. With approx. 98,000 cubic yards to be relocated that would increase the closure costs for the pond by \$107,800.

All of the costs are shown in Appendix B.

6.0 Summary

Therefore, it is not only feasible to work towards closure of one pond at a time, but it appears to be financially correct as well.

To recap; the total costs for both ponds together in one closure plan (in 1999 dollars)

Closure Plan costs	\$3,654,843
Post Closure costs	<u>\$193,505</u>
Total cost for Financial Assurance	\$3,848,348

This figure can be carried over to a closure year of 2013. (14 more years)

By closing one pond at a time, the costs are :

Closure Plan costs (North)	\$1,991,801
Post Closure costs (North)	\$173,381
Closure Plan costs (South)	\$1,684,517
Post Closure costs (South)	<u>\$173,030</u>
Total cost for Financial Assurance	\$4,022,729

However, only 1,857,547 will be carried out beyond the next 5 years.

All of the other requirements set forth in the previous plan remain except as modified in this plan.

Prior to actual closure, a formal field survey of the ponds and their contents should be performed. This should be an aerial survey, and probably should be considered as soon as possible. It would give a better idea of how much of each pond is being utilized.

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**Post Closure Plan
(Modified)**

7.0 Information

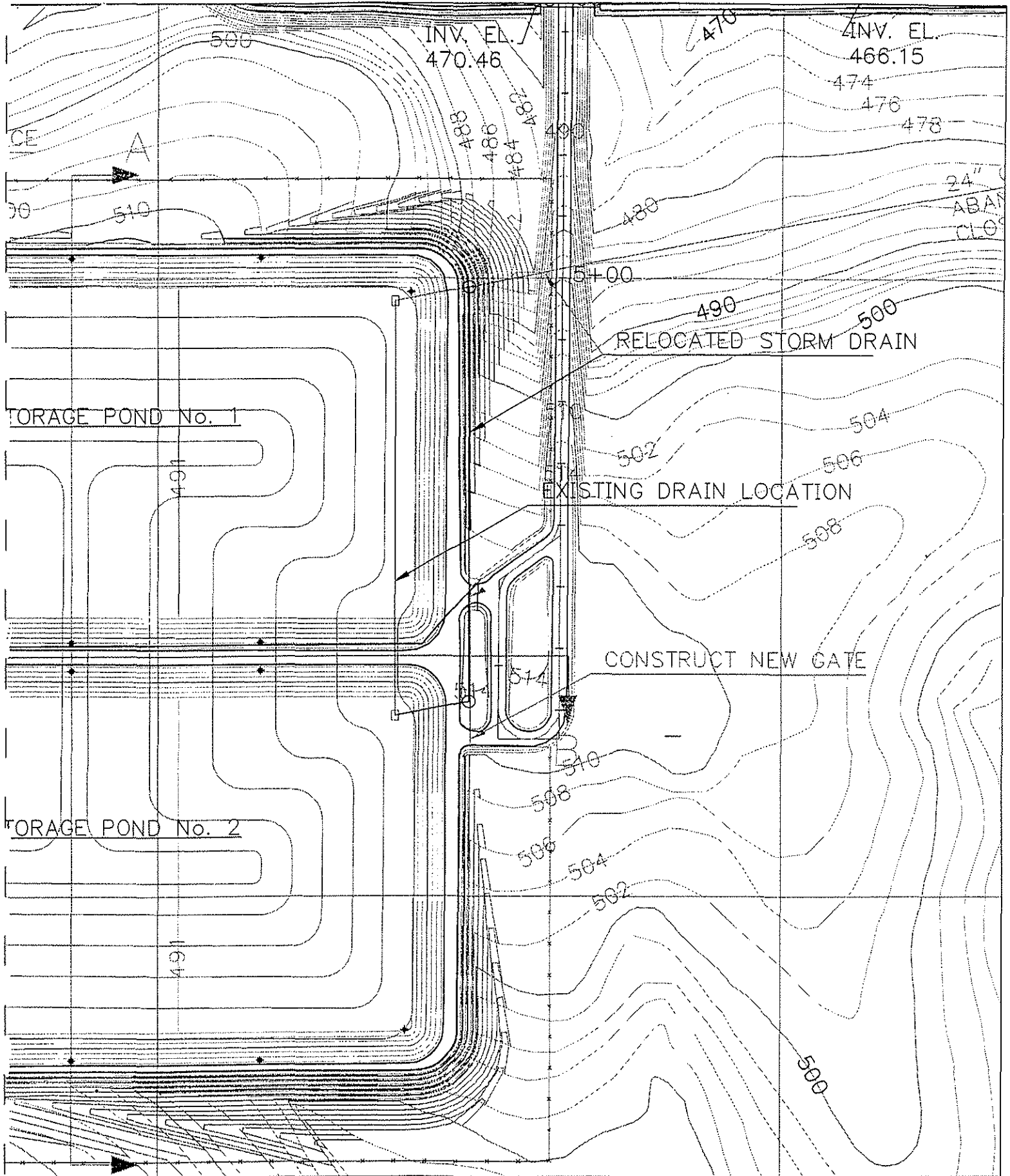
The requirements for Post Closure remain as outlined in the original plan, dated 1993. While only half the area is remaining open, the testing procedures will not change. The amount of tests, and the frequency are for an individual closure. Therefore, at the end of the final closure for the second pond, the testing may be combined.

Many of these issues may be addressed with a face to face meeting with the appropriate personnel at ODEQ.

Prior to proceeding further with this study, and revised plan, we recommend a combined meeting with the user, WFEC, the AE, GUERNSEY, and the reviewing agency, ODEQ.

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APPENDIX A



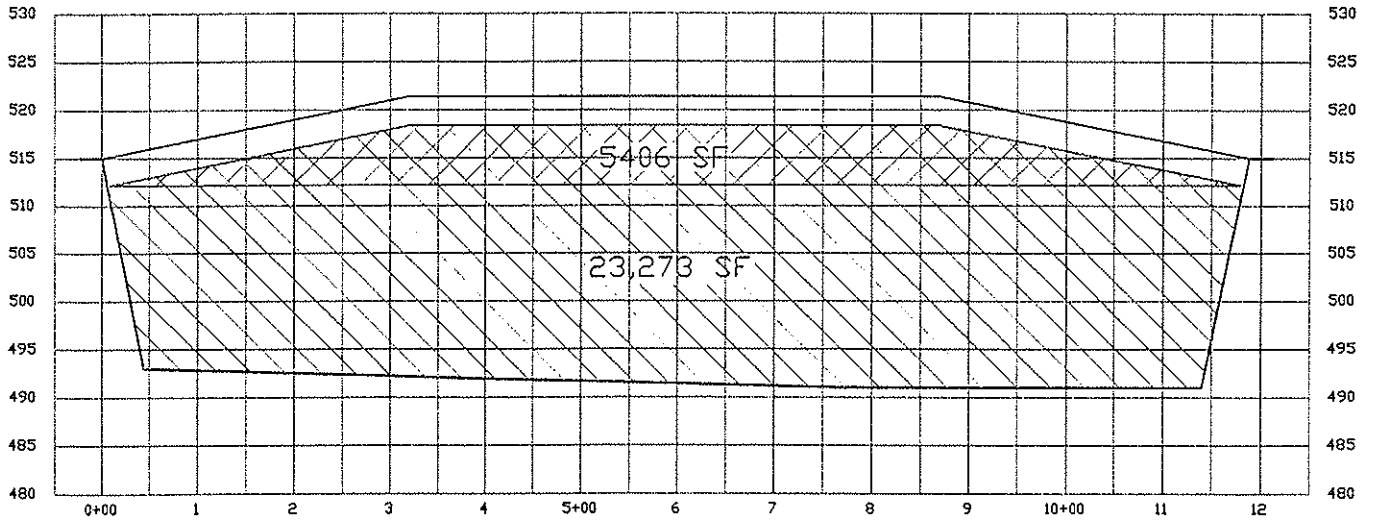
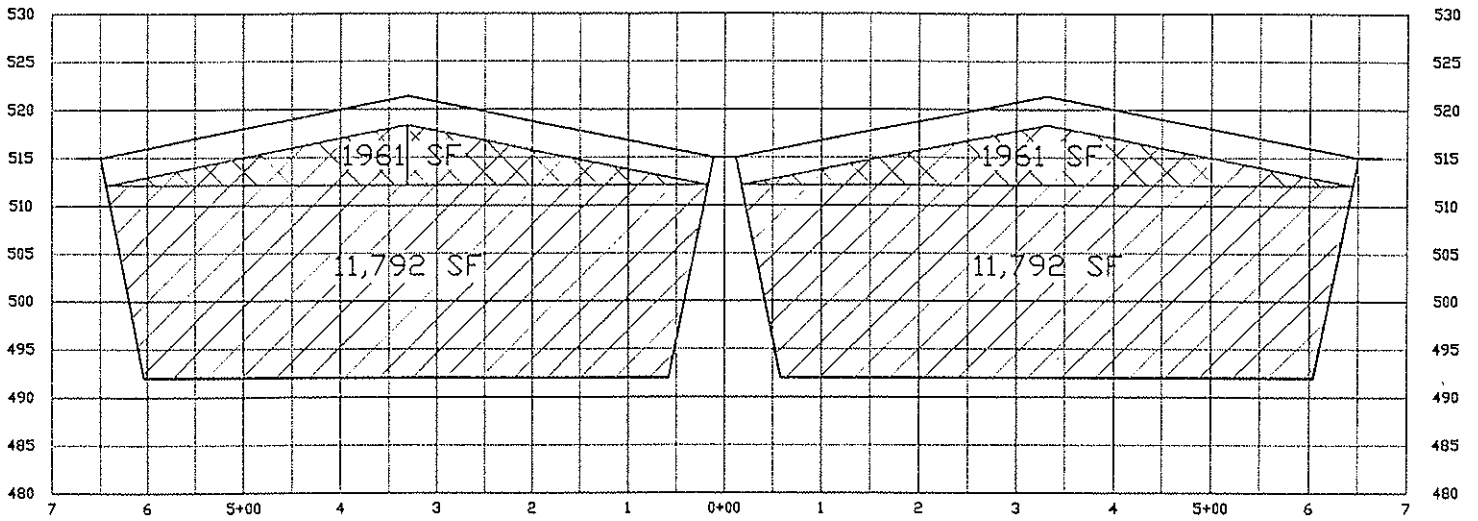
C.H. GUERNSEY & COMPANY
 Engineers • Architects • Consultants

WESTERN FARMER'S ELECTRIC COOPERATIVE
 HUGO OK

PREPARED BY: ROB HASKINS
 APPROVED BY: RAY WALTERS

PROJECT NAME: FLY ASH POND CLOSURE PLAN
 AMENDMENT NO: MODIFICATION 1-1999

SKETCH NO:
 C-1



C.H. GUERNSEY & COMPANY
Engineers • Architects • Consultants

WESTERN FARMER'S ELECTRIC COOPERATIVE

HUGO OK

PREPARED BY: ROB HASKINS
APPROVED BY: RAY WALTERS

PROJECT NAME: FLY ASH POND CLOSURE PLAN
AMENDMENT NO: MODIFICATION 1-1999

SKETCH NO:
C-2

APPENDIX B

WESTERN FARMERS ELECTRIC COOPERATIVE
Hugo Generating Plant
Estimate of Probable Costs

				Unit	Total
Final Closure of Fiyash Ponds 1 and 2					
Earthwork					
Right of Way Clearing and Restoration	40	Acre	1,240.00		49,600.00
Excavation Clay and Haul, 2 mi. R/T	210,609	CY	7.20		1,516,384.80
Placement with Compaction	168,487	CY	2.65		446,491.08
Topsoil	30,700	CY	13.75		422,125.00
Fertilize, Seed and Mulch	1,750	MSF	43.50		76,125.00
Haul Road - 8" Thick Rock with Fabric	8,450	LF	7.52		63,544.00
Storm Water Collection/Diversion System					
Inlet-Outlet Structures	3	EA	2,100.00		6,300.00
24" Corrugated Steel Pipe	2,420	LF	41.00		99,220.00
Utility Trench and Backfill	2,150	CY	10.32		22,188.00
Drainage Ditches	1,600	CY	2.00		3,200.00
New Monitoring Well	3	EA	5,000.00		15,000.00
Removal of Existing Systems					
Remove existing Concrete Anchors	12	EA	500.00		6,000.00
Remove existing DI Dispersion Pipe	1,200	LF	12.00		14,400.00
Plug Existing Monitoring Well	3	EA	300.00		900.00
Security System					
5-Strand Barbed Wire Fencing	5,400	LF	12.50		67,500.00
Gates	2	EA	720.00		1,440.00
Signage	1	LS	1,000.00		1,000.00
Construction Cost in 1999 Dollars					\$2,811,417.88
Estimate of Probable Construction Costs					2,811,417.88
Engineering and Administration Services @ 20.00%					562,283.58
Contingencies @ 10.00%					281,141.79
Estimate of Final Closure Costs					\$3,654,843.24

Estimate Costs base on 1999 Means Sitework Cost Guide

WESTERN FARMERS ELECTRIC COOPERATIVE
Hugo Generating Plant
Estimate of Probable Costs

			Unit	Total
Post Closure of Flyash Ponds 1 and 2				
Routine Inspection	16	Semi- Annual	655.00	10,480.00
Maintenance of On-Site Improvements	8	Annual	1,275.00	10,200.00
Final Plugging of Groundwater Monitoring Wells	10	EA	1,600.00	16,000.00
Maintaining Vegetation	16	Semi- Annual	1,370.00	21,920.00
Repairing Final Cover	4,000	CY	7.20	28,800.00
Maintaining Surface Drainage System	540	LF	4.50	2,430.00
Replacing Defective Groundwater Wells	2	EA	4,470.00	8,940.00
Plugging Defective Groundwater Wells	2	EA	1,600.00	3,200.00
Air Sampling	N/A		0.00	0.00
Soil Sampling	N/A		0.00	0.00
Gas Sampling	N/A		0.00	0.00
Groundwater Monitor Wells Sampling and Analysis	96	Semi- Annual	295.00	28,320.00
Surface Water Sampling	N/A		0.00	0.00
Collection Costs	16	Semi- Annual	1,160.00	18,560.00
Construction Cost in 1993 Dollars				\$148,850.00
Estimate of Probable Construction Costs				148,850.00
Engineering and Administration Services @	20.00%			29,770.00
Contingencies @	10.00%			14,885.00
Estimate of Final Closure Costs				\$193,505.00

WESTERN FARMERS ELECTRIC COOPERATIVE
Hugo Generating Plant
Estimate of Probable Costs

Item No.	Description	Quantity	Units	Unit Cost	Total Cost
Final Closure of Flyash Pond					
Earthwork					
	Right of Way Clearing and Restoration	20	Acre	1,240.00	24,800.00
	Excavation Clay and Haul, 2 mi. R/T	105,305	CY	7.20	758,192.40
	Placement with Compaction	84,244	CY	2.65	223,245.54
	Topsoil	15,350	CY	13.75	211,062.50
	Fertilize, Seed and Mulch	875	MSF	43.50	38,062.50
	Haul Road - 8" Thick Rock with Fabric	0	LF	7.52	0.00
Storm Water Collection/Diversion System					
	Drainage Ditches	600	CY	2.00	1,200.00
	New Monitoring Well	1	EA	5,000.00	5,000.00
Removal of Existing Systems					
	Remove existing Concrete Anchors	0	EA	500.00	0.00
	Remove existing DI Dispersion Pipe	0	LF	12.00	0.00
	Plug Existing Monitoring Well	0	EA	300.00	0.00
Security System					
	5-Strand Barbed Wire Fencing	2,600	LF	12.50	32,500.00
	Gates	1	EA	720.00	720.00
	Signage	1	LS	1,000.00	1,000.00
Construction Cost in 1999 Dollars					\$1,295,782.94
Estimate of Probable Construction Costs					1,295,782.94
Engineering and Administration Services @ 20.00%					259,156.59
Contingencies @ 10.00%					129,578.29
Estimate of Final Closure Costs					\$1,684,517.82

Estimate Costs base on 1999 Means Sitework Cost Guide

POND VOLUMES

STA ft	AREA sf	VOL. cy	CUM. VOL. cy
TO TOP OF DIKE			
0.00	0		
		5,565	5,565
38.23	11,792		
		122,754	128,319
319.30	11,792		
		234,903	363,222
857.16	11,792		
		120,919	484,142
1,134.03	11,792		
		6,148	490,290
1,176.26	0		
ABOVE TOP OF DIKE			
0.00	0		
		7,732	7,732
319.30	1,961		
		39,073	46,805
857.16	1,961		
		7,727	54,532
1,176.26	0		
POND NO	% FULL	% FULL VOLUME cy	AVAILABLE VOLUME cy
1	60.00%	294,174	250,648
2	20.00%	98,058	446,764
	TOTAL	392,232	697,412

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CREATE AMAZING.

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