MISSOURI PUBLIC SERVICE COMMISSION

STAFF REPORT

COST OF SERVICE

REVENUE REQUIREMENT

APPENDIX 3

Other Staff Schedules

UNION ELECTRIC COMPANY

d/b/a Ameren Missouri

CASE NO. ER-2014-0258

Jefferson City, Missouri
December 2014

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**** Denotes Highly Confidential Information ****

Purpose of Staff's Construction Audit and Prudence Review

Staff has performed this audit to determine the appropriate level of construction costs related to the replacement of the Callaway Reactor Vessel Closure Head (RVCH) Project to be used for the purposes of setting rates, and to provide an independent and objective assessment of the utility's performance as it relates to this specific construction project activity. In providing this recommendation, Staff has examined Ameren Missouri's (1) entry into agreements to pursue the replacement of the RVCH, (2) undertaking the removal of the old reactor head and the installation of the new RVCH, and (3) persisting with the replacement of the RVCH in light of whether those decisions or the costs associated with those decisions were (a) inappropriate, (b) unreasonable, (c) excessive, (d) unreasonable or inappropriately allocated, (e) not of benefit to Missouri ratepayers, or (f) related to unnecessary facilities; where such decision would result in harm to Ameren Missouri's ratepayers, in light of the following factors established by Staff:

1. Impact on rate base,
2. Projected operation & maintenance expense,
3. Projected fuel and consumable-related expense,
4. Projected effect on the Fuel and Purchase Power Cost Recovery Mechanisms,
5. Projected effect on depreciation rates and expense,
6. Projected operational impacts including plant dispatchability, dispatch order, or reductions to net generation,
7. Consistency with the utility's Preferred Resource Plan effective at the time the project was undertaken, and as subsequently updated or superseded,
8. Compliance with State and Federal mandates that go into effect during the construction of the Project,
9. Compliance with settlements or other agreements, and

10. Evaluation of other projects to improve this project.

Staff Expert/Witness: Erin M. Carle

Risk Assessment

At the time of its direct testimony filing, the Audit Staff determined that there was no significant indication that the Callaway RVCH Project costs incurred to date are imprudent, unreasonable, inappropriate, and/or not of benefit to Missouri ratepayer charges. The Audit Staff's basis for this concern is based on a thorough examination of all actual costs in its possessions at the time of direct filing. The Audit Staff will continue to assess all actual costs through the December 31, 2014 true-up cut-off established by the Commission in this rate proceeding, and will bring any concerns based on new information provided to Staff forward at that time.

Staff Expert/Witness: Erin M. Carle

Audit Scope

The Staff's first step in determining the scope of its construction audit and prudence review of the appropriateness of Ameren Missouri's RVCH at their Callaway Energy Center ("Callaway") costs for recovery from ratepayers was to determine the time period that would be reviewed. In the Commission's *Order Adopting Procedural Schedule, Establishing Test Year, and Delegating Authority* issued on August 20, 2014, in Case No. ER-2014-0258, the Commission ordered a true-up cut-off date for the Audit Staff review of all charges associated with the Callaway RVCH Project through December 31, 2014. However, the latest information available to the Audit Staff for purposes of this filing includes costs incurred for the Callaway RVCH Project through July, 2014. It has been ordered that Ameren Missouri provide updated costs related to the Callaway RVCH Project through the period of December 31, 2014, to the Staff no later than February 6, 2015. Once the updated costs through December 31, 2014 are

received, the Audit Staff will audit and review this data for prudence, reasonableness, appropriateness, and/or benefit to Missouri ratepayers of recovery from Ameren Missouri ratepayers.

As part of its audit scope, the Audit Staff will propose adjustments for charges it has identified as being imprudent, unreasonable, inappropriate, and/or not of benefit to Missouri ratepayers through the period ending July 2014. After Ameren Missouri provides costs through the period ending December 31, 2014, the Staff will update this report for any additional costs identified as being imprudent, unreasonable, inappropriate, and/or not of benefit to Missouri ratepayers.

As part of its audit scope, the Audit Staff reviewed the cost and schedule controls utilized by Ameren Missouri and its project managers in order to familiarize itself with the policies and procedures Ameren Missouri had in place to control costs and mitigate risks for the Callaway RVCH Project. The Audit Staff also reviewed the following documents during the audit process:

1. AREVA NP, Inc.'s monthly cost report and weekly progress meeting minutes
2. Key vendor contracts
3. Ameren Missouri Board of Director Minutes
4. Work Orders
5. Change Order Requests (CORs) and Requests for Work Order Extensions
6. Purchase Order Summaries
7. Internal/External Audit Reports and Findings
8. Requests for Proposal Letters
9. Internal Procedures and Policies for Ameren Missouri

The Audit Staff also:

1. Cross-referenced all charges with purchase orders and work packages, to the extent possible;

2. Identified unexplained charges that were not supported by purchase orders or purchase order line distributed amounts; and

3. Visited the construction site and conducted interviews with key project personnel regarding project status, cost controls and change order authorization processes. The specific individual interviewed was Tim Pettus, Supervising Engineer, Engineering Projects for Ameren Missouri.

Staff Expert/Witness: Erin M. Carle

Audit Objectives

Staff's audit of the Callaway RVCH Project will determine whether Ameren Missouri has incurred charges for the Project for recovery from Ameren Missouri ratepayers that are imprudent, unreasonable, inappropriate, and/or not of benefit to Missouri ratepayers, or are for an investment that has not met the required in-service criteria. If any such charges are found, Staff will develop recommended adjustments to the Commission to remove these costs from the cost of the Callaway RVCH Project included in Ameren Missouri's rate base in this rate case.

Staff Expert/Witness: Erin M. Carle

Project Status

Fully Operational and Useful for Service:

At the time of Staff's filing of direct testimony, Staff has determined that Ameren Missouri's replacement Callaway's RVCH is fully operational and in-service as of November 21, 2014. This project consisted of the replacement of an existing component; therefore, the In-Service Testing Criteria that is typically implemented for new construction and for plant modifications was not used for Callaway's RVCH Project. Additionally, this

construction project was required to meet Nuclear Regulatory Commission ("NRC") standards before Callaway was allowed to return to service.

Staff Expert/Witness: Jerry Scheible

Ending Allowance for Funds Used During Construction (AFUDC)

Staff follows the guidelines established by the Federal Energy Regulatory Commission ("FERC") regarding the capitalization of AFUDC. Generally speaking, AFUDC represents the net cost of money used for construction purposes that is also capitalized in conjunction with capital investment projects. FERC's Accounting Release Number 5 (AR-5) (Revised), in answer to the question "What is the proper period for capitalization of AFUDC?" states:

> Capitalization of AFUDC stops when the facilities have been tested and are placed in, or ready for, service. This would include those portions of construction projects completed and put into service although the project is not fully completed.[1]

In at least two prior rate cases, the Commission has taken the same position. In the Report & Order for Case Number ER-82-52 with Union Electric, the Commission found for the calculation of AFUDC:

> Whenever construction work in progress is excluded from rate base, the utility incurs a cost in carrying the construction project from the time construction funds are borrowed until the plant is placed in service and starts to earn a return from the ratepayer. The cost is reflected by capitalizing AFUDC.
>
> AFUDC is calculated according to a formula established by FERC, adopted as part of the Uniform System of Accounts. (18 CFR part 101, Electric Plant Constructions, par. 3 (17)). This formula specifies, among other things, the method for determining the various sources of funds used for construction.2

[1] Found on FERC's website at: http://www.ferc.gov/legal/acct-matts/docs/ar-5.asp

[2] Reports of the Public Service Commission of the State of Missouri, Volume 25 (New Series), Pages 225-226 (emphasis added)

Then, in the Report & Order for Case Number ER-83-49 with Kansas City Power & Light, in its findings regarding deferred taxes offset to rate base, the Commission stated:

> AFDC is accrued on the Company's CWIP until such time as it becomes fully operational and used for service. At that time the cost of construction, including all accrued AFDC, is included in the Company's rate base3.

Staff's definition of the date for ending AFUDC is consistent with the FERC definition previously cited.

Through July 2014, the ending AFUDC amount for the Callaway RVCH Project is **_____ **. Ameren Missouri will stop booking AFUDC on November 21, 2014, the date that Callaway went back on-line from its most recent refueling outage.

Staff Expert/Witness: Erin M. Carle

Gross Capital Cost and Expenses of the Project and Recommended Cost

When Ameren Missouri first decided to install the new RVCH at Callaway, they began with a budget of ** _____ **. The ending budget for the replacement is **_____ **. ** _____

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_____ ** The ending budget is the final cost for all analysis and engineering for the Callaway RVCH Project. The beginning and ending budgeted balance is shown is shown in the table below.

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[3] Reports of the Public Service Commission of the State of Missouri, Volume 26 (New Series, Page 131 (emphasis added)

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The above budget was presented and approved by the Board of Directors on June 29, 2009, with the increase costs approved on October 22, 2014. Staff has reviewed the increased expenses and has found them to be reasonable.

Staff Expert/Witness: Erin M. Carle

Gross Operational Impact of the Project and Recommended Level

No impact on operations is expected at this time; however, the replacement of the RVCH will potentially reduce the average outage time for all future Callaway refuelings by as much as two days. The new RVCH has design changes that will eliminate a portion of the procedure necessary during previous refuelings.

Staff Expert/Witness: Jerry Scheible

Decision to Replace the RVCH

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Staff Expert/Witness: Erin M. Carle

Decision to Upgrade the RVCH using the Integrated Head Assembly

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Staff Expert/Witness: Erin M. Carle

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Recommendations Concerning Contracting Approach

Decision of Contracting Approach

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Staff Expert/Witness: Erin M. Carle

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Bidding Process – Who Responded to Bids, Who Won, Why

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Staff Expert/Witness: Erin M. Carle

Cost and Schedule Management

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Staff Expert/Witness: Erin M. Carle

Project Detail, Schedule and Milestones from Beginning to End

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Staff Expert/Witness: Erin M. Carle

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Adjustments

At the time of this direct testimony filing, the final costs have not been provided to the Audit Staff. For purposes of this filing, Staff is not proposing any adjustments to actual

Callaway RVCH Project costs through July 31, 2014; however, Staff will review actual cost information subsequent to that date as part of the true-up audit sponsor any necessary adjustments at that time.

Staff Expert/Witness: Erin M. Carle

Purpose of Staff's Construction Audit and Prudence Review

Staff notes that it is performing this audit to determine the appropriate level of construction costs related to the Labadie Energy Center Electrostatic Precipitator (ESP) Project ("Labadie ESP Project") to be used for purposes of setting rates, and to provide an independent and objective assessment of the utility's performance as it relates to these specific construction project activities. In providing this recommendation, Staff has examined Ameren Missouri's; (1) entry into agreements to pursue the construction of the ESPs, (2) undertaking of the construction of the ESPs, and (3) persisting with the construction of the ESPs in light of whether those decisions or the costs associated with those decisions were (a) inappropriate, (b) unreasonable, (c) excessive, (d) unreasonably or inappropriately allocated, (e) not of benefit to Missouri ratepayers, or (f) related to unnecessary facilities; where such decision would result in harm to Ameren Missouri's ratepayers, in light of the following factors established by Staff:

1. Impact on rate base,
2. Projected operation & maintenance expense,
3. Projected fuel and consumable-related expense,
4. Projected effect on the Fuel and Purchased-Power Cost Recovery Mechanisms,
5. Projected effect on depreciation rates and expense,
6. Projected operational impacts, including plant dispatchability, dispatch order, or reductions to net generation,
7. Consistency with the utility's Preferred Resource Plan effective at the time the project was undertaken, and as subsequently updated or superseded,
8. Compliance with State and Federal environmental and renewable energy standards and any other applicable State or Federal mandates in effect during the construction of the project,
9. Compliance with settlements or other agreements, and
10. Evaluation of other projects to improve this project.

Staff Expert/Witness: Erin M. Carle

Risk Assessment

The Audit Staff determined that there was a possibility that the Labadie ESP Project included charges that were imprudent, unreasonable, inappropriate, and/or not-of-benefit-to-Missouri ratepayers. The Audit Staff's basis for this concern is an evaluation of all of the factors pertaining to an incident affecting project construction costs that took place on May 29, 2013. Staff conducted a thorough examination of this incident to identify all costs associated with it. Details about the incident will be discussed later in this report.

Staff Expert/Witness: Erin M. Carle

Audit Scope

The Staff's first step in determining the scope of its construction audit and prudence review of the appropriateness of Ameren Missouri's Labadie ESP Project costs for recovery from ratepayers was to determine the time period that would be reviewed. In the Commission's *Order Adopting Procedural Schedule, Establishing Test Year, and Delegating Authority* issued on August 20, 2014, in Case No. ER-2014-0258, the Commission ordered a true-up cut-off date for the Audit Staff review of all charges associated with the Labadie ESP Project through December 31, 2014. However, the latest information available to the Audit Staff for purposes of its December 5, 2014, direct testimony filing includes costs incurred for the Labadie ESP Project through September 2014. It has been ordered that Ameren Missouri provide updated costs related to the Labadie ESP Project through the period of December 31, 2014, to the Staff by February 6, 2015. Once the updated costs through December 31, 2014, are received, the Audit Staff will audit and review this data for prudence, reasonableness, appropriateness, and/or benefit to Missouri ratepayers of recovery from Ameren Missouri ratepayers.

For purposes of this filing, the Audit Staff is only proposing adjustments for charges it

has identified as being imprudent, unreasonable, inappropriate, and/or not-of-benefit-to-Missouri ratepayers through the period ending September 2014. After Ameren Missouri provides costs through the period ending December 31, 2014, the Staff will update this report for any additional costs identified as being imprudent, unreasonable, inappropriate, and/or not-of-benefit-to-Missouri ratepayers.

As part of its audit scope, the Audit Staff reviewed the cost and schedule controls utilized by Ameren Missouri and its project managers in order to familiarize itself with the policies and procedures Ameren Missouri had in place to control costs and mitigate risks for the Labadie ESP Project. The Audit Staff also reviewed the following documents during the audit process:

1. Alberici Constructors Inc. ("ACI") Monthly Cost Report and Weekly Progress Meeting Minutes;
2. Southern Environmental ("SEI") Monthly Status Report, Minutes for Weekly Conference Calls;
3. Key vendor contracts;
4. Ameren Missouri Board of Directors Minutes;
5. Work Orders;
6. Change Order Requests ("CORs") and Requests for Work Order Extensions;
7. Purchase Order Summaries;
8. Internal/External Audit Reports and Findings;
9. Requests for Proposal Letters; and
10. Internal Procedures and Policies for Ameren Missouri.

The Audit Staff also:

1. Cross-referenced all charges with purchase orders and work packages, to the extent possible;
2. Identified unexplained charges that were not supported by purchase orders or purchase order line distribution amounts; and
3. Visited the construction site and conducted an interview with key project personnel regarding project status, cost controls and change order authorization processes. The

specific individual interviewed was Thomas Callahan, Environmental Projects Manager.

Staff Expert/Witness: Erin M. Carle

Audit Objectives

Staff's audit will determine whether Ameren Missouri has incurred charges for the Labadie ESP Project for recovery from Ameren Missouri ratepayers that are imprudent, unreasonable, inappropriate, and/or not-of-benefit-to- Missouri ratepayers, or are for an investment that has not met the required in-service criteria. If any such charges are found, Staff will develop recommended adjustments to the Commission to remove these costs from the cost of the Labadie ESP Project included in Ameren Missouri's rate base in this rate case.

Staff Expert/Witness: Erin M. Carle

Project Status

Fully Operational and Used for Service:

Staff and Ameren Missouri representatives previously agreed to a set of in-service criteria to verify that the Labadie ESP Project is complete, the units are fully operational and used for service, and should be considered for inclusion in rate base.

Unit 2 was returned to service on June 5, 2014. Staff performed site-visits to verify the operation of Unit 2 and to witness the performance testing in progress. The in-service criteria for Unit 2 were satisfied as of August 13, 2014, and Staff and Ameren Missouri agree to that being the date the Unit will be considered fully operational and used for service.

Unit 1 construction was basically complete at the time of the drafting of this report. Staff has performed site-visits to witness the construction progress of Unit 1. Further site-visits will occur, including witnessing the performance testing in progress, which is predicted to occur in early December 2014. The in-service criteria for Unit 1 will then be reviewed by Staff and a

date that the Unit should be considered fully operational and used for service will be determined.

Staff Expert/Witness: Jerry Scheible

Ending Allowance for Funds Used During Construction ("AFUDC")

Staff follows the guidelines established by the Federal Energy Regulatory Commission ("FERC") regarding the capitalization of AFUDC. Generally speaking, AFUDC represents the net cost of money used for construction purposes that is also capitalized in conjunction with capital investment projects. FERC's Accounting Release Number 5 ("AR-5") (Revised), in answer to the question "What is the proper period for capitalization of Allowance for Funds Used During Construction (AFUDC)?" states:

> Capitalization of AFUDC stops when the facilities have been tested and are placed in, or ready for, service. This would include those portions of construction projects completed and put into service although the project is not fully completed.[1]

In at least two prior rate cases, the Commission has taken the same position. In the *Report & Order* for Case Number ER-82-52 with Union Electric, the Commission found for the calculation of AFUDC the following:

> Whenever construction work in progress is excluded from rate base, the utility incurs a cost in carrying the construction project from the time construction funds are borrowed *until the plant is placed in service and starts to earn a return from the ratepayer*. The cost is reflected by capitalizing AFUDC.
> AFUDC is calculated according to a formula established by FERC, adopted as part of the Uniform System of Accounts. (18 CFR part 101, Electric Plant Constructions, par. 3 (17)). This formula specifies, among other things, the method for determining the various sources of funds used for construction.[2]

Then, in the *Report & Order* for Case Number ER-83-49 with Kansas City Power & Light, in its findings regarding deferred taxes offset to rate base, the Commission stated:

[1] Found on FERC's website at: http://www.ferc.gov/legal/acct-matts/docs/ar-5.asp
[2] *In the Matter of Union Electric Co.*, 25 Mo.P.S.C. (N.S.) 194, 225-226 (1982).

> AFDC is accrued on the Company's CWIP *until such time as it becomes fully operational and used for service*. At that time the cost of construction, including all accrued AFDC, is included in the Company's rate base.[3]

Staff's definition of the date for ending AFUDC is consistent with the FERC definition previously cited. Ameren Missouri stopped booking AFUDC on Unit 2 on August 13, 2014, which represented the date that the Labadie ESP Project was determined to be fully operational and used for service and at the point in time when the Labadie ESP Project met all testing requirements. Staff's recommended date for ending AFUDC for Ameren Missouri's Labadie Unit 1 ESP project will be addressed during the true-up of this case based upon a determination that the Labadie ESP Project is fully operational and used for service and the completion of all necessary testing requirements.

Staff Expert/Witness: Erin M. Carle

Gross Capital Cost and Expenses of the Project and Recommended Cost

When Ameren Missouri first decided to install the Electro-Static Precipitators at their Labadie Energy Center, they began with a budget of ** _____ ** for Unit 1 and ** _____ ** for Unit 2. The ending budget for Unit 1 was ** _____ ** and actual costs for Unit 2 was ** _____ **. Ameren Missouri explained that the increase for Unit 2 is due to higher levels associated with indirect overhead loadings for the project and also an increase in engineering expenses. Staff has reviewed the increased expenses and has found them to be reasonable. ** _____

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[3] *In the Matter of Kansas City Power & Light Co.,* 26 Mo.P.S.C. (N.S.) 104, 131 (1983). "AFDC" is equivalent to "AFUDC."

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_____ ** As of the December 5, 2014, direct testimony filing, Staff is still reviewing the information that was received on November 7, 2014. Staff notes that it reserves the right to propose further adjustments to the Labadie ESP Project costs in the true-up portion of this case, if appropriate.

Staff Expert/Witness: Erin M. Carle

Gross Operational Impact of the Project and Recommended Level

Gross Operational Impact of the project is expected to be a net reduction in capacity of approximately 1.1 MW per unit due to auxiliary power requirements of operating the Labadie ESP Project. This amounts to a less than 0.2% reduction in production.

Staff Expert/Witness: Jerry Scheible

Decision to Perform Environmental Retrofits

The sole reason that Ameren Missouri decided to complete environmental retrofits at their Labadie Energy Center was due to a federal Mercury and Air Toxics Standards ("MATS") ruling passed by the Environmental Protection Agency ("EPA"). The MATS includes emission limits for mercury, particulate matter, and acid gases. Ameren Missouri had an initial deadline of April 16, 2015, to comply with MATS. They submitted a request and were granted a one-year extension from the Missouri Department of Natural Resources, making their new due date April 16, 2016.

Ameren Missouri worked with its consultant, the Shaw Group, in 2011 to evaluate eight different scenarios for filterable particulate compliance to meet the EPA's MATS rule that was finalized in February 2012. For the eight scenarios, the cost, schedule, and risk were evaluated for each. Below is a table that details each of the eight scenarios evaluated as provided in response to Staff data request No. 275:

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Screening Level Review of Options						
No.	**Option**	**Risks**	**Relative ROM Cost**	**Duration (from ESP or PJFF Vendor Award)**	**Pros/Cons**	**Option Examined in Greater Detail**
1	Install New Free Standing Fabric Filter (PJFF), Existing ESPs remain in place	• Increased pressure drop – New ID Fan & Boiler/Duct Stiffening (NFPA) • Footprint – Long Duct Runs for Units 2 and 3, space needed for four PJFF	High	20-24 Months	• Best Particulate Matter Removal Performance • Increased Pressure Drop/Higher ID Fan Aux Power Consumption • Highest O&M (Bag & Cage Replacement and Pressure Drop Electricity) • Compatible Option with potential future DSI/PAC/MACT Compliance Technologies • Shortest (minimal tie-in) Unit Outage for PJFF tie-in • ESP Ash LOI (sales) are not affected, since future PAC injected into downstream PJFF	Yes
2	Convert ESP A&B to Fabric Filter (PJFF) – No work on ESP C	• Increased pressure drop – New ID Fan & Boiler/Duct Stiffening (NFPA) • Constructability Issues • Outage Time for Construction	Medium	22-26 Months	• Small S&B ESP Boxes limit flue gas flow to 33% at 4/1 air to cloth ratio. 67% of flue gas flow to C ESP, which excessive • Questionable Particulate Matter Removal Performance, due to high C ESP flue gas velocity • Increase Pressure Drop/Intermediate ID Fan Aux Power Consumption • Outage Time and construction risk working in tight area • High O&M (Bag & Cage Replacement and PJFF pressure drop)	No

Screening Level Review of Options						
3	Convert ESP C to Fabric Filter (PJFF) & Rebuild ESP A&B	• Increased pressure drop – New IDF & Boiler/Duct Stiffening (NFPA) • Constructability Issues • Outage time for construction	Medium	22-26 Months	• Good Particulate Matter Removal Performance, similar to Option 2 • Increased Pressure Drop/Intermediate ID Fan Aux Power Consumption • Outage time and construction risk working in tight area • High O&M (Bag Replacement and Pressure Drop Electricity)	Yes
4	COHPAC II (high air to cloth ratio PJFF)	• Lack of Experience with Design • Increased pressure drop – New IDF & Boiler/Duct Stiffening • High Flue Gas Velocity • Constructability Issues • Outage time for construction	High	26-30 Months	• Lack of Fleet Experience and US experience • Reliability Guarantee Questionable • Increased Pressure Drop/Higher ID Fan Aux Power Consumption • Outage time and construction risk working in tight area • Good Particulate Matter Removal, just Below Option 1 • Potentially Highest O&M (more frequent bag/cage replacement and pressure drop electricity)	No
5	ESP Rebuilds – Convert C ESP to run in Series with A&B ESPs. Complete rebuild of all ESP – No Ductwork Mods.	• Condition of Existing ESP, Casing/Hoppers • Footprint – limited space to run new ducts • New ID Fans (Eliminate C ID Fan) • Constructability Issues • Outage time for construction	Medium	26-30 Months	• PM Emission Guarantees Questionable • Increased Pressure Drop/Higher ID Fan Aux Power Consumption than other ESP options • Outage time and construction risk working in tight area • Moderate O&M (ESP electricity and Pressure Drop) • High Flue Gas Velocity	No

Screening Level Review of Options						
6	Complete ESP Rebuild – Add Field to ESP A&B	• Condition of Existing ESP, Casing/Hoppers • General Arrangement • Constructability • Outage time for construction	Medium	26-30 Months	• PM Emission Guarantees need to be evaluated and confirmed • Operating Costs only slightly higher than other ESP Rebuild Options • Particulate Removal better than Options 5 & 7 • Outage time and construction risk working in tight area • Lower O&M (ESP Electricity and Pressure Drop)	Yes
7	ESP Flue Gas Conditioning (FGC, Non-SO_3 Injection) with ESP NH_3 or NA (Trona)	• Lack of Compatibility with Hg and HCI Control • Particulate Removal Performance • Operating costs of FGC reagent	Low	12 Months	• Particulate Performance Guarantees likely not to be met, too risky • Filterable and Condensable OM needs to be investigated • NH3 contamination, potential loss of Ash sales • O&M associated with FGC • Minimal Outage Time	No
8	Convert ESP C to Fabric Filter (PJFF) & Rebuild ESP A&B, Put A/B in Series with C	• High Flue Gas Velocity (air to cloth ratio) • Increased pressure drop – New ID Fan & Boiler/Duct Stiffening (NFPA) • Constructability issues • Outage time for construction	High	26-30 Months	• With regard to DSI/PAC/MACT Compliance – this option may allow future ESP ash sales • Increased Pressure Drop/High ID Fan Aux Pwr (high velocity & sum of ESP & PJFF pressure drops) • Low particulate matter loading to high air to cloth ratio PJFF. Bag/cage replacement cost issues for this high velocity full flow PJFF • Similar Particulate Matter Removal Performance to Option 1 • Outage Time and construction risk working in tight area • Highest O&M (Bag & Cage Replacement and Pressure Drop Electricity)	No

From the above analysis, Ameren Missouri chose the top three options for closer

evaluation. Options 1, 3 and 6 were the three chosen to review in more detail. After performing a more in-depth analysis, Ameren Missouri determined that Option 6 was the best option to proceed with to meet the MATS requirements. After reviewing all of the information, Staff agrees that Option 6 was the best method to proceed with.

Staff Expert/Witness: Erin M. Carle

Decision to Perform these specific Environmental Retrofits

In response to MATS, Ameren Missouri chose to install ESPs at their Labadie Energy Center. MATS was signed on December 16, 2011, by the EPA, with an effective date of April 16, 2012. Generally, MATS is a mandated rule for power plants to reduce emissions of toxic air pollutants to acceptable levels. Specifically, the rule targets the emissions of heavy metals, including mercury, arsenic chromium, and nickel. Along with the heavy metals, power plants must also reduce the emissions of acid gases, such as hydrochloric acid and hydrofluoric acid. These emissions have been linked to causing cancer and other serious health effects.

Ameren Missouri, along with all other existing fossil fuel (coal and oil fired) power plants in the United States, have up to four years to comply with the rules. This is the original three years provided to all sources by the Clean Air Act ("CAA") and an additional one year extension granted by the state permitting authorities.

Ameren Missouri is meeting this requirement by installing ESPs on Labadie Units 1 and 2. According to MATS, the measurement of particulate emissions is based on an overall for the facility. If Ameren Missouri is able to remove a sufficient amount of particulate emissions using the ESPs on Units 1 and 2, the need for extensive upgrades for Units 3 and 4 will be unlikely.

Staff Expert/Witness: Erin M. Carle

Operational Requirements

The Operation and Maintenance ("O&M") cost for all four of the ESPs at the Labadie plant totaled $418,950 for 2013. The O&M of the new components will be similar, in terms of both labor and expense, to the O&M of the components that were replaced and retired. No changes in projected O&M cost have been proposed by Ameren Missouri.

Staff Expert/Witness: Jerry Scheible

Recommendations Concerning Contracting Approach

Decision of Contracting Approach, Who Bid, Who Won, and Why

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Staff Expert/Witness: Erin M. Carle

Cost and Schedule Management

The Audit Staff reviewed the policies and procedures utilized by Ameren Missouri for procuring bids for the ESP project. Ameren Missouri began by issuing a "Request for Bid" to various contractors that they felt were capable of performing the required environmental upgrade. Upon receipt of the bids, Ameren Missouri staff, along with approval from the Board of Directors, determined which contractor would receive the contract. The winning contractors

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are discussed in more detail in the "Decision of Contracting Approach, Who Bid, Who Won, and Why" section of this report.

Ameren Missouri utilized numerous methods for cost and schedule management during the course of the Labadie ESP project. There are approximately ten internal control and Code of Conduct documents that are specific to the Labadie ESP project. These documents were supplied in response to Staff Data Request No. 15 in Case No. EO-2014-0070. Ameren Missouri developed a supplement to Procedure AMN-ADM-4016 to specifically apply to the Labadie ESP Project Procedure AMN-ADM-4016, the Change Management Plan. The main purpose of this procedure is to establish a consistent process to identify, initiate, document, evaluate, implement, and control proposed changes to scope, schedule, cost, or quality of a project. The "Communications Plan" utilized for the Labadie ESP Project guides Ameren Missouri employees as well as all contractors on the job through the communication process and the organizational chart for the project. GEN-ADM-2151 is the Project Management Manual. The sections that apply directly to the Labadie ESP Project are: GEN_FRM_ADM2151-10 – Procurement Plan; GEN-ADM-2151 – Project Management; GEN-ADM-2151-08 – Safety Plan; GEN-ADM-2151-11 – Commissioning Plant Template; GEN-ADM-2151-09 – Quality Management Plan; and GEN-FRM-ADM-2151-07 – Communication Plan (Modified). The main purpose of the GEN-ADM-2151 is to provide standards and expectations for managing projects to promote the consistent initiation, planning, execution, monitoring and control, and close-out of approved Ameren Missouri engineering and construction projects. In addition to the above plans created to guide and instruct Ameren Missouri Staff and Contractor's through the construction process, there is also the "Risk Management Plan" and the "Quality Plan" that have been developed specifically for the Labadie ESP Project. The "Risk Management Plan" is used to

identify risks and investigate, communicate and develop necessary risk response strategies. The "Quality Plan" is to ensure that all project engineering and materials meet Ameren Missouri's standards.

Staff Expert/Witness: Erin M. Carle

Project Detail, Schedule and Milestones from Beginning to End

The environmental upgrades taking place at the Labadie Energy Center are in response to the MATS issued by the EPA. The decision to install the ESP's was approved in July 2012, by Robert Schweppe, Dave Strubberg, Robert Meiners, D. Fox, Charles Naslund, Warner Baxter, and Thomas Voss. The existing ESP Units A and B have been retired in place. The ductwork has been sealed off to prevent outside contamination. The new ESPs, Units 1 and 2, have been built above Units A and B. This was the most efficient, cost-effective method since the area the ESP units have been built in is a very tight area. It would have required extensive, costly man hours to remove the existing ESP units. EPS Unit C has been upgraded to work with Units 1 and 2 and a new D precipitator has been built. Along with the prior mentioned upgrades and installs, new duct work, fly ash removal devices, and electrical systems have been installed to work along with the ESP upgrades. The approved budget for Unit 1 is ** _____ ** and for Unit 2 **_____ **.

Unit 2 met all in-service criteria on August 13, 2014. At the time of this filing, Unit 1 was still going through the in-service testing. It is anticipated that Unit 1 will officially be in-service prior to December 31, 2014.

The major milestones for Unit 2 are documented in the chart below:

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The major milestones for Unit 1 are documented in the chart below.

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Once Unit 1 is in-service, all major milestones will be complete for the project.

Staff Expert/Witness: Erin M. Carle

Incident/Adjustment

On May 29, 2013, one-hundred and eighty (180) collector plates for the Labadie ESP Project were being stored on-site at the Labadie Energy Center. On this day, ninety-four (94) of the plates on the rack fell over. This was caused by the steel "staple", used to hold bundles of collector plates together while they were on the storage rack, unbending. It is believed that the wind speed could have been a factor in causing this event. The approximate wind speed on this day was 25 miles per hour. When the 94 bundles fell over, they were damaged beyond repair and could not be used for the Labadie ESP Project. Since this incident, the method of storage

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was re-examined. It was determined that the style of storage rack would need to be changed. Instead of using the steel "staple" to hold the plates in place, the new storage rack had additional bracing in the form of steel framing and the bundles were tack welded to the rack frame. The "staples" were replaced with all-thread bolts and vertical supports were welded onto the rack in various locations to provide additional support for the bundles. After these storage rack improvements, no further incidents took place.

As a result of this incident, Ameren Missouri had to pay out $391,000 to purchase new collector plates. They also decreased their builders risk deductible, which resulted in an additional $32,500 premium increase. Ameren Missouri applied $13,500 as a credit towards the ESP project that represents the amount Ameren Missouri collected as the scrap value of the 180 damaged collector plates.

Staff asserts that the incremental expenses incurred by Ameren Missouri because of this incident should not be recovered from its customers. The chart below summarizes the Staff's proposed adjustment:

Cost of Replacement Plates	$391,000
Less: Scrap Value of Damaged Plates	$ (13,500)
Cost of Replacement Plates less scrap	$377,500
Plus: AFUDC accrued on replaced plates	$ 30,548
Total Adjustment	$408,048

Staff is sponsoring adjustment P51.2 to remove $408,048 from plant and adjustment R51.3 to remove $3,504 from depreciation reserve associated to the cost of the Labadie ESP Project. This adjustment removes the cost of the replacement collector plates, as well as all applicable AFUDC.

Staff Expert/Witness: Erin M. Carle

Other Adjustments

At the time of this filing, the ESP equipment for Labadie Energy Center Unit 1 is still in the testing phase necessary to meet the "in-service" criteria agreed upon by the Staff and Ameren Missouri. Staff will review all documentation regarding the final stages of the Unit 1 installation and to make any further adjustments based upon the additional information received as part of its true-up audit. Costs associated with the ** _____ ** that were discussed previously and that are applicable to the construction costs associated with Labadie Units 1 and 2, as well as all actual ESP construction costs associated with Labadie Unit 1, will be addressed as part of the Staff's true-up audit.

Staff Expert/Witness: Erin M. Carle

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Solar Electrical Generator

In-Service Test Criteria

O'Fallon Renewable Energy Center

1. All major construction work is complete.

2. All preoperational tests have been successfully completed.

3. Facility successfully meets contract operational guarantees that are necessary for satisfactory completion of all other items in this list.

4. Upon observation of the facility for 72 consecutive hours the facility will have demonstrated that when sunlight was shining on it during that period it produced power in a standard operating mode.

5. Facility shall meet at least 95% of the guaranteed capacity (4.5 MW AC) based on the Capacity Test as outlined in the contract or amended contract. The Capacity Test shall determine the facility's Corrected Capacity at the Design Point Conditions.

6. Sufficient transmission/distribution interconnection facilities shall exist for the total plant design net electrical capacity at the time the facility is declared fully operational and used for service.

7. Sufficient transmission/distribution facilities shall exist for the total plant design net electrical capacity into the utility service territory at the time the facility is declared fully operational and used for service.

Smart Grid Solutions Employed by Ameren Missouri[1]

Mature technology solutions include the following:

- **Smart Line Capacitors** ** _____
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  _____
  _____
  _____
  _____
  _____ **[2]

- **Automatic Voltage Regulation and Control**. ** _____
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  _____ **[3]

- **Microprocessor Digital Relaying.** ** _____
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[1] Ameren Missouri Responses to Data Requests MPSC 0248 through and including MPSC 0265.

[2] Ameren Missouri Response to Data Request MPSC 0248.

[3] Ameren Missouri Response to Data Request MPSC 0249.

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- **Supervisory Control and Data Acquisition ("SCADA").** These systems are deployed in all the switchyards and provide real-time outage notification for enhanced outage response performance, improved operating flexibility and prevention of overloads.

- **Smart Line Switches.** ** _____

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- **Automatic Supply Line Transfer.** ** _____

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- **Outage Management System ("OMS," and commonly referred to as the Outage Analysis System ("OAS") and Advanced Distribution Management System ("ADMS").** ** _____

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[4] Ameren Missouri Response to Data Request MPSC 0250.

[5] Ameren Missouri Response to Data Request MPSC 0251.

[6] Ameren Missouri Response to Data Request MPSC 0253.

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New technology solutions include the following:

- **Transformer Insulating Oil Dissolved Gas Monitors.** This equipment provides real-time monitoring of the moisture and combustible gases that are dissolved in the insulating oil of generator step-up transformers (20kV to 138 or 345kV) large power, transmission substation, subtransmission substation, and distribution substation transformers. The detection of certain combustible gases and moisture provides an early warning system of an impending transformer internal fault that will destroy the transformer and cause significant collateral damage. ** _____

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- **High Voltage Bushing Monitors.** These are devices that are installed on each high voltage bushing of generator step-up transformers, transmission substation autotransformers,[9] and subtransmission and distribution substation transformers to

[7] Ameren Missouri Response to Data Request MPSC 0254.

[8] Ameren Missouri Response to Data Request MPSC 0255.

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[9] An autotransformer utilizes one set of windings with multiple connection points to change voltage levels.

monitor the insulating oil quality or integrity. These monitors detect small degradations in the insulating level of the bushing that, if allowed to continue, would decrease the insulating capability of the bushing to the point of failure causing significant damage to transformer. ** _____ _____ _____ _____ _____ _____ _____ _____ **[10]

- **Fiber Optic Winding Temperature Sensor.** These devices monitor the condition of a transformer and an autotransformer's cooling system and allow more accurate loading to the actual operating capability of the transformer. ** _____ _____ _____ _____ _____ _____ _____ _____ **[11]

- **Comprehensive Analysis Monitor.** This equipment uses weather data and online transformer sensor inputs to calculate accurate dynamic transmission substation autotransformer ratings. This equipment will allow closer operating margins and more accurate determination of the autotransformer rating. ** Currently deployed on 4 of the existing 27 (14%) autotransformers, with plans to deploy on all new

[10] Ameren Missouri Response to Data Request MPSC 0256.

[11] Ameren Missouri Response to Data Request MPSC 0257

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_____ **[12]

- **Multi-Function Transformer Temperature Monitor.** These monitors perform simulation of several autotransformer and transformer winding temperatures to allow optimum cooling during high transformer loading and prediction of unstable temperature conditions. ** _____

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_____ **[13]

- **Phase Measurement Units ("PMUs").** These devices provide highly accurate voltage, current and frequency monitoring at strategic transmission points to provide wide-area situational awareness to detect impending serious upset conditions and allow correction actions to be taken to mitigate the event. ** _____

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_____ **[14]

- **Faulted Circuit Indicators (FCI).** These devices provide information on subtransmission (20kV to 100kV) and distribution (under 20kV) line disturbances and communicate this information to system operators in near real time. ** _____

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[12] Ameren Missouri Response to Data Request MPSC 0258

[13] Ameren Missouri Response to Data Request MPSC 0259

[14] Ameren Missouri Response to Data Request MPSC 0260.

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- **Smart Line Regulators.** These devices monitor and regulate line voltage via remote control of the regulator's tap changing mechanism. ** _____

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- **Wide Area Networks ("WANs").** A WAN is a high capacity communications backbone network that transports large quantities of smart field device data to Ameren Missouri's control centers. ** _____

_____ ** [17]

- **Field Area Networks ("FANs").** A FAN is a wireless communication network that collects transmitted data from smart field devices and relays this information via traditional radio/cellular-based networks. There are 82 distribution line devices using this type of network, with annual additions based upon system needs.[18]

- **Local Area Network (LAN).** These networks aggregate data and provide communications from smart field devices to the WAN. A fiber LAN was placed in service in October 2014 at MLK substation in downtown St. Louis. Additionally, LANs are used in 18 transmission and sub-transmission substations to transfer monitor data associated with physical security devices (security cameras, card readers, etc.), phasor measurement units ("PMUs"), and smart transformer monitors back to the control center.[19]

[15] Ameren Missouri Response to Data Request MPSC 0261.

[16] Ameren Missouri Response to Data Request MPSC 0262.

[17] Ameren Missouri Response to Data Request MPSC 0263.1.

[18] Ameren Missouri Response to Data Request MPSC 0264.1.

[19] Ameren Missouri Response to Data Request MPSC 0265.1.

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	AMEREN MISSOURI Case ER-2014-0258	Staff Recommendation Depreciation Rates (Using Interim Net Salvage Only)										
	Revised 12/1/2014											
	SUMMARY OF ESTIMATED SURVIVOR CURVES, NET SALVAGE PERCENT, ORIGINAL COST, BOOK DEPRECIATION RESERVE AND CALCULATED											
	ANNUAL DEPRECIATION ACCRUAL RATES USING PLANT BALANCES AS OF DECEMBER 31, 2013											
	DEPRECIABLE GROUP	Probable Retirement Year	Survivor Curve	Net Salvage Percent	Original Cost As of 12/31/2013	Book Depreciation Reserve	Interim Net Salvage Only Future Accruals	Total Accruals	Total Future Accruals	Calc Annual Accrual Amount	Staff Annual Accrual Rate %	FERC Acc
	STEAM PRODUCTION PLANT											
	MERAMEC Steam Production Plant											
311	STRUCTURES AND IMPROVEMENTS	Sep-22	100-R1.5	(1)	48,223,669	29,894,581	482,237	48,705,905	18,811,324	2,176,814	4.51	311
312	BOILER PLANT EQUIPMENT	Sep-22	55-R0.5	(5)	453,953,820	191,751,341	22,697,691	476,651,511	284,900,170	33,985,828	7.49	312
314	TURBOGENERATOR UNITS	Sep-22	60-S0	(2)	112,735,774	62,019,740	2,254,715	114,990,489	52,970,749	6,211,146	5.51	314
315	ACCESSORY ELECTRIC EQUIPMENT	Sep-22	70-S0	(1)	49,625,841	27,614,854	496,258	50,122,100	22,507,246	2,626,126	5.29	315
316	MISCELLANEOUS POWER PLANT EQUIPMENT	Sep-22	40-L0	0	12,854,262	3,663,514	0	12,854,262	9,190,748	1,140,165	8.87	316
316.21	Misc Power Plant - Office Furniture											
	Fully Accrued		Fully Accrued		111,864	111,864						
	Amortized		20-SQ		950,544	555,850	0	950,544	394,694	47,541	5.00	316.21
	Total Office Furniture				1,062,408	667,714						
316.22	Misc Power Plant - Office Equipment											
	Fully Accrued		Fully Accrued		28,525	28,525						
	Amortized		15-SQ		91,945	52,670	0	91,945	39,275	6,133	6.67	316.22
	Total Office Equipment				120,470	81,195						
316.23	Misc Power Plant - Computers (PCs)											
	Fully Accrued		Fully Accrued		1,073,900	1,073,900						
	Amortized		5-SQ		784,739	318,510	0	784,739	466,229	156,926	20.00	316.23
	Total Computers				1,858,639	1,392,410						
	Total Meramec Steam Production				*680,434,882*	*317,085,349*						
	SIOUX Steam Production Plant											
311	STRUCTURES AND IMPROVEMENTS	Sep-33	100-R1.5	(1)	52,298,858.65	18,866,782	522,989	52,821,847	33,955,065	1,764,161	3.37	311
312	BOILER PLANT EQUIPMENT	Sep-33	55-R0.5	(5)	961,884,526.06	228,055,852	48,094,226	1,009,978,752	781,922,900	43,146,580	4.49	312
314	TURBOGENERATOR UNITS	Sep-33	60-S0	(2)	121,189,132.61	44,098,128	2,423,783	123,612,915	79,514,787	4,329,620	3.57	314
315	ACCESSORY ELECTRIC EQUIPMENT	Sep-33	70-S0	(1)	62,980,181.15	19,884,369	629,802	63,609,983	43,725,614	2,332,276	3.70	315
316	MISCELLANEOUS POWER PLANT EQUIPMENT	Sep-33	40-L0	0	9,930,436.87	-63,729	0	9,930,437	9,994,166	609,337	6.14	316
316.21	Misc Power Plant - Office Furniture											
	Fully Accrued		Fully Accrued		97,124.79	97,125						
	Amortized		20-SQ		608,132.24	374,700	0	608,132	233,432	30,379	5.00	316.21
	Total Office Furniture				705,257	471,825						

	DEPRECIABLE GROUP	Probable Retirement Year	Survivor Curve	Net Salvage Percent	Original Cost As of 12/31/2013	Book Depreciation Reserve	Interim Net Salvage Only Future Accruals	Total Accruals	Total Future Accruals	Calc Annual Accrual Amount	Staff Annual Accrual Rate %	FERC Acc
316.22	Misc Power Plant - Office Equipment											
	Fully Accrued		Fully Accrued		9,247.29	9,247						
	Amortized		15-SQ		75,597.91	43,510	0	75,598	32,088	5,041	6.67	316.22
	Total Office Equipment				84,845	52,757						
316.23	Misc Power Plant - Computers											
	Fully Accrued		Fully Accrued		393,658.80	393,659						
	Amortized		5-SQ		773,704	422,650	0	773,704	351,054	154,710	20.00	316.23
	Total Computers				1,167,363	816,309						
	Total Sioux Steam Production				*1,210,240,600*	*312,182,293*						
	Labadie Steam Production Plant											
311	STRUCTURES AND IMPROVEMENTS	Sep-42	100-R1.5	(1)	65,770,199.93	38,321,941	657,702	66,427,902	28,105,961	1,026,804	1.56	311
312	BOILER PLANT EQUIPMENT	Sep-42	55-R0.5	(5)	653,000,563.25	336,663,148	32,650,028	685,650,591	348,987,443	14,257,890	2.18	312
312.3	BOILER PLANT EQUIPMENT - Aluminum Coal Cars		25-R25	25	78,408,815.09	52,036,036	-19,602,204	58,806,611	6,770,575	538,154	0.69	312.3
314	TURBOGENERATOR UNITS	Sep-42	60-S0	(2)	235,499,603.37	84,602,292	4,709,992	240,209,595	155,607,303	6,141,789	2.61	314
315	ACCESSORY ELECTRIC EQUIPMENT	Sep-42	70-S0	(1)	98,114,752.47	42,742,134	981,148	99,095,900	56,353,766	2,161,499	2.20	315
316	MISCELLANEOUS POWER PLANT EQUIPMENT	Sep-42	40-L0	0	14,648,675.04	3,057,417	0	14,648,675	11,591,258	560,641	3.83	316
316.21	Misc Power Plant - Office Furniture											
	Fully Accrued		Fully Accrued		462,867.04	462,867						
	Amortized		20-SQ		809,724.84	540,500	0	809,725	269,225	40,515	5.00	316.21
	Total Office Furniture				1,272,592	1,003,367						
316.22	Misc Power Plant - Office Equipment											
	Fully Accrued		Fully Accrued		46,973.57	46,974						
	Amortized		15-SQ		135,478.00	81,700	0	135,478	53,778	9,040	6.67	316.22
	Total Office Equipment				182,452	128,674						
316.23	Misc Power Plant - Computers (PCs)											
	Fully Accrued		Fully Accrued		808,702.33	808,702						
	Amortized		5-SQ		1,574,757	485,110	0	1,574,757	1,089,647	315,010	20.00	316.23
	Total Computers				2,383,459	1,293,812						
	Total Labadie Steam Production				*1,149,281,112*	*559,848,821*						
	RUSH ISLAND Steam Production Plant											
311	STRUCTURES AND IMPROVEMENTS	Sep-45	100-R1.5	(1)	67,733,297.70	35,819,608	677,333	68,410,631	32,591,023	1,078,848	1.59	311
312	BOILER PLANT EQUIPMENT	Sep-45	55-R0.5	(5)	407,297,657.92	200,794,490	20,364,883	427,662,541	226,868,051	8,509,098	2.09	312
314	TURBOGENERATOR UNITS	Sep-45	60-S0	(2)	159,102,738.84	50,015,108	3,182,055	162,284,794	112,269,686	4,086,339	2.57	314
315	ACCESSORY ELECTRIC EQUIPMENT	Sep-45	70-S0	(1)	48,737,236.38	19,870,407	487,372	49,224,609	29,354,202	1,029,846	2.11	315
316	MISCELLANEOUS POWER PLANT EQUIPMENT	Sep-45	40-L0	0	10,774,169.76	1,702,324	0	10,774,170	9,071,846	397,592	3.69	316

	DEPRECIABLE GROUP	Probable Retirement Year	Survivor Curve	Net Salvage Percent	Original Cost As of 12/31/2013	Book Depreciation Reserve	Interim Net Salvage Only Future Accruals	Total Accruals	Total Future Accruals	Calc Annual Accrual Amount	Staff Annual Accrual Rate %	FERC Acc
316.21	Misc Power Plant - Office Furniture											
	Fully Accrued		Fully Accrued		32,066.05	32,066						
	Amortized		20-SQ		1,117,653.28	557,100	0	1,117,653	560,553	55,926	5.00	316.21
	Total Office Furniture				1,149,719	589,166						
316.22	Misc Power Plant - Office Equipment											
	Fully Accrued		Fully Accrued		15,061.70	15,062						
	Amortized		15-SQ		153,398.46	70,400	0	153,398	82,998	10,227	6.67	316.22
	Total Office Equipment				168,460	85,462						
316.23	Misc Power Plant - Computers (PCs)											
	Fully Accrued		Fully Accrued		412,231.17	412,231						
	Amortized		5-SQ		709,230.72	356,670	0	709,231	352,561	141,850	20.00	316.23
	Total Computers				1,121,462	768,901						
	Total Rush Island Steam Production				*696,084,742*	*309,645,466*						
	COMMON - All Steam Plants											
311	STRUCTURES AND IMPROVEMENTS	Sep-42	100-R1.5	(1)	1,959,206	539,828	19,592	1,978,798	1,438,970	52,060	2.66	311
312	BOILER PLANT EQUIPMENT	Sep-42	55-R0.5	(5)	36,387,959.50	12,557,707	1,819,398	38,207,357	25,649,650	1,025,951	2.82	312
315	ACCESSORY ELECTRIC EQUIPMENT	Sep-42	70-S0	(1)	3,129,974.57	884,386	31,300	3,161,274	2,276,888	87,032	2.78	315
316	MISCELLANEOUS POWER PLANT EQUIPMENT	Sep-42	40-L0	0	17,331.45	2,931	0	17,331	14,400	672	3.88	316
	Total Common - All Steam Production Plants				*41,494,471*	*13,984,852*						
	TOTAL STEAM PRODUCTION PLANT				*3,777,535,807*	*1,512,746,780*						
	NUCLEAR PRODUCTION PLANT											
	Callaway											
321	STRUCTURES AND IMPROVEMENTS	Oct-44	100-R1.5		917,353,077	560,779,794	9,173,531	926,526,608	365,746,814	12,547,617	1.37	321
322	REACTOR PLANT EQUIPMENT	Oct-44	55-R0.5		1,057,077,498.37	445,233,695	63,424,650	1,120,502,148	675,268,453	26,531,503	2.51	322
323	TURBOGENERATOR UNITS	Oct-44	50-S1		511,748,437.93	223,958,045	15,352,453	527,100,891	303,142,846	12,523,052	2.45	323
324	ACCESSORY ELECTRIC EQUIPMENT	Oct-44	80-R2		234,020,887.90	130,851,814	2,340,209	236,361,097	105,509,283	3,664,465	1.57	324
325	MISCELLANEOUS POWER PLANT EQUIPMENT	Oct-44	35-L0		118,751,139.29	-6,168,974	0	118,751,139	124,920,113	6,314,686	5.32	325
325.21	Misc Power Plant - Office Furniture											
	Fully Accrued		Fully Accrued		491,871.99	491,872						
	Amortized		20-SQ		4,808,156.12	1,746,630	0	4,808,156	3,061,526	240,217	5.00	325.21
	Total Office Furniture				5,300,028.11	2,238,502						
325.22	Misc Power Plant - Office Equipment											
	Fully Accrued		Fully Accrued		1,432,295.27	1,432,295						
	Amortized		15-SQ		3,076,064.70	939,730	0	3,076,065	2,136,335	205,072	6.67	325.22
	Total Office Equipment				4,508,360	2,372,025						

	DEPRECIABLE GROUP	Probable Retirement Year	Survivor Curve	Net Salvage Percent	Original Cost As of 12/31/2013	Book Depreciation Reserve	Interim Net Salvage Only Future Accruals	Total Accruals	Total Future Accruals	Calc Annual Accrual Amount	Staff Annual Accrual Rate %	FERC Acc
325.23	Misc Power Plant - Computers (PCs)											
	Fully Accrued		Fully Accrued		4,668,210.87	4,668,211						
	Amortized		5-SQ		4,663,806.95	2,153,062	0	4,663,807	2,510,745	932,652	20.00	325.23
	Total Computers				9,332,018	6,821,273						
	TOTAL NUCLEAR PRODUCTION PLANT				2,858,091,446	1,366,086,174						
	Hydraulic Production Plant											
	OSAGE											
331	STRUCTURES AND IMPROVEMENTS	Jun-47	130-R1	(1)	4,317,633.83	745,248	129,529	4,447,163	3,701,915	117,852	2.73	331
332	RESERVOIRS, DAMS, WATERWAYS	Jun-47	150-R2.5	(6)	31,747,290.67	15,613,301	317,473	32,064,764	16,451,463	505,335	1.59	332
333	WATER WHEELS, TURBINES, GENERATORS	Jun-47	95-S0.5	(3)	61,613,651.51	12,520,939	8,625,911	70,239,563	57,718,624	1,806,746	2.93	333
334	ACCESSORY ELECTRIC EQUIPMENT	Jun-47	65-R0.5	(1)	16,754,277	323,246	335,086	17,089,363	16,766,117	575,400	3.43	334
335	MISCELLANEOUS POWER PLANT EQUIPMENT	Jun-47	55-O1	0	1,837,723.85	145,740	36,754	1,874,478	1,728,738	62,377	3.39	335
335.21	Misc Power Plant - Office Furniture											
	Fully Accrued		Fully Accrued		1,818.98	1,819						
	Amortized		20-SQ		58,229.91	7,900	0	58,230	50,330	2,912	5.00	335.21
	Total Office Furniture				60,048.89	9,719						
335.22	Misc Power Plant - Office Equipment											
	Fully Accrued		Fully Accrued		0.00	0						
	Amortized		15-SQ		16,584.44	3,030	0	16,584	13,554	1,107	6.67	335.22
	Total Office Equipment				16,584	3,030						
335.23	Misc Power Plant - Computers (PCs)											
	Fully Accrued		Fully Accrued		110,468.90	110,469						
	Amortized		5-SQ		541,271.01	326,870	0	541,271	214,401	108,275	20.00	335.23
	Total Computers				651,740	437,339						
336	Roads, Railroads, Bridges	Jun-47	50-R0.5		77,445	46,373	0	77,445	31,072	1,781	2.30	
	TOTAL OSAGE				117,076,395	29,844,935						
	KEOKUK											
331	STRUCTURES AND IMPROVEMENTS	Jun-55	130-R1	(1)	5,995,063.83	1,847,526	179,852	6,174,916	4,327,390	111,596	1.86	331
332	RESERVOIRS, DAMS, WATERWAYS	Jun-55	150-R2.5	(6)	14,706,507.45	6,834,854	147,066	14,853,573	8,018,719	200,145	1.36	332
333	WATER WHEELS, TURBINES, GENERATORS	Jun-55	95-S0.5	(3)	104,033,992.36	16,293,240	14,564,759	118,598,751	102,305,511	2,635,088	2.53	333
334	ACCESSORY ELECTRIC EQUIPMENT	Jun-55	65-R0.5	(1)	11,176,677.59	1,974,121	223,533	11,400,211	9,426,090	278,984	2.50	334
335	MISCELLANEOUS POWER PLANT EQUIPMENT	Jun-55	55-O1	0	3,214,688.78	320,535	64,294	3,278,983	2,958,448	93,260	2.90	335
335.21	Misc Power Plant - Office Furniture											
	Fully Accrued		Fully Accrued		43,761.38	43,761						
	Amortized		20-SQ		69,009.67	29,900	0	69,010	39,110	3,451	5.00	335.21
	Total Office Furniture				112,771.05	73,661						

	DEPRECIABLE GROUP	Probable Retirement Year	Survivor Curve	Net Salvage Percent	Original Cost As of 12/31/2013	Book Depreciation Reserve	Interim Net Salvage Only Future Accruals	Total Accruals	Total Future Accruals	Calc Annual Accrual Amount	Staff Annual Accrual Rate %	FERC Acc
335.22	Misc Power Plant - Office Equipment											
	Fully Accrued		Fully Accrued		16,760.65	16,761						
	Amortized		15-SQ		45,854.58	10,750	0	45,855	35,105	3,060	6.67	335.22
	Total Office Equipment				62,615	27,511						
335.23	Misc Power Plant - Computers (PCs)											
	Fully Accrued		Fully Accrued		138,411.80	138,412						
	Amortized		5-SQ		568,066.27	341,630	0	568,066	226,436	113,589	20.00	335.23
	Total Computers				706,478	480,042						
336	Roads, Railroads, Bridges	Jun-55	50-R0.5		114,926	75,331	1	114,927	39,596	1,328	1.16	336
	TOTAL KEOKUK				140,123,720	27,926,821						
	TAUM SAUK											
331	STRUCTURES AND IMPROVEMENTS	Jun-89	130-R1	(1)	36,705,654.13	3,831,238	1,101,170	37,806,824	33,975,586	501,980	1.37	331
332	RESERVOIRS, DAMS, WATERWAYS	Jun-89	150-R2.5	(6)	12,002,283.75	-7,869,610	120,023	12,122,307	19,991,917	287,265	2.39	332
333	WATER WHEELS, TURBINES, GENERATORS	Jun-89	95-S0.5	(3)	52,632,204.57	11,223,553	7,368,508	60,000,713	48,777,160	798,950	1.52	333
334	ACCESSORY ELECTRIC EQUIPMENT	Jun-89	65-R0.5	(1)	7,904,552.17	791,465	158,091	8,062,643	7,271,178	144,356	1.83	334
335	MISCELLANEOUS POWER PLANT EQUIPMENT	Jun-89	55-O1	0	3,248,296.94	-123,089	64,966	3,313,263	3,436,352	73,938	2.28	335
335.21	Misc Power Plant - Office Furniture											
	Fully Accrued		Fully Accrued		5,259.59	5,260						
	Amortized		20-SQ	0	70,763.36	22,130	0	70,763	48,633	3,540	5.00	335.21
	Total Office Furniture				76,022.95	27,390						
335.22	Misc Power Plant - Office Equipment											
	Fully Accrued		Fully Accrued		3,727.30	3,727						
	Amortized		15-SQ	0	386,795.96	94,530	0	386,796	292,266	25,787	6.67	335.22
	Total Office Equipment				390,523	98,257						
335.23	Misc Power Plant - Computers (PCs)											
	Fully Accrued		Fully Accrued		195,637.68	195,638						
	Amortized		5-SQ	0	336,161.13	216,695	0	336,161	119,466	67,221	20.00	335.23
	Total Computers				531,799	412,333						
336	Roads, Railroads, Bridges	Jun-89	50-R0.5	0	232,193	75,437	0	232,193	156,756	3,414	1.47	0
	TOTAL TAUM SAUK				113,723,530	8,466,974						
	TOTAL HYDRAULIC PRODUCTION				370,923,645	66,238,729						

	DEPRECIABLE GROUP	Probable Retirement Year	Survivor Curve	Net Salvage Percent	Original Cost As of 12/31/2013	Book Depreciation Reserve	Interim Net Salvage Only Future Accruals	Total Accruals	Total Future Accruals	Calc Annual Accrual Amount	Staff Annual Accrual Rate %	FERC Acc
	OTHER PRODUCTION											
341	STRUCTURES AND IMPROVEMENTS		40-R2.5	(5)	37,427,821.98	9,798,810	1,871,391	39,299,213	29,500,403	929,009	2.48	341
342	FUEL HOLDER, PRODUCRES, ACCESSORIES		40-R3	(5)	45,344,696.56	10,079,246	2,267,234	47,611,931	37,532,685	1,179,324	2.60	342
344	GENERATORS											
	Generators - CTGs		40-R4	(5)	1,048,129,271.70	510,039,428	52,406,463	1,100,535,735	590,496,307	20,237,731	1.93	344
344.??	**Generator - Landfill CTG**		6-S2	40	5,874,837.22	692,927	-2,349,935	3,524,902	2,831,975	626,543	10.66	**344.??**
344.??	Generators - Solar		20-S2.5	0	1,265,598.51	194,994	0	1,265,599	1,070,605	64,846	5.12	**344.??**
344.??	Generators - Wind	20 yr life	45-R2	(17)	New Account & Depreciation rate assignment for Wind Generators						6.81	**344.??**
345	ACCESSORY ELECTRIC EQUIPMENT		35-R2.5	(5)	90,304,704.43	21,369,642	4,515,236	94,819,940	73,450,298	2,915,488	3.23	345
346	MISCELLANEOUS POWER PLANT EQUIPMENT		20-L2.5	(5)	5,142,198.94	294,084	257,110	5,399,309	5,105,225	405,459	7.88	346
346.21	Misc Power Plant - Office Furniture											
	Fully Accrued		Fully Accrued		73.50	74						
	Amortized		20-SQ	0	411,106.97	189,250	0	411,107	221,857	20,541	5.00	346.21
	Total Office Furniture				411,180.47	189,324						
346.22	Misc Power Plant - Office Equipment											
	Fully Accrued		Fully Accrued		0.00	0						
	Amortized		15-SQ	0	167,698.91	33,900	0	167,699	133,799	11,180	6.67	346.22
	Total Office Equipment				167,699	33,900						
346.23	Misc Power Plant - Computers (PCs)											
	Fully Accrued		Fully Accrued		830,753.67	830,754						
	Amortized		5-SQ	0	586,580.60	345,540	0	586,581	241,041	117,292	20.00	346.23
	Total Computers				1,417,334	1,176,294						
	TOTAL OTHER				1,235,485,343	553,868,648						
	TOTAL PRODUCTION PLANT				8,242,036,242	3,498,940,332						
	TRANSMISSION PLANT											
352	STRUCTURES AND IMPROVEMENTS		60-R2.5	(5)	6,863,495.57	2,784,140	343,174	7,206,670	4,422,530	127,881	1.86	352
353	STATION EQUIPMENT		60-R2.5	(5)	282,710,652.62	76,494,416	14,135,532	296,846,185	220,351,769	4,722,179	1.67	353
354	TOWERS AND FIXTURES		70-R4	(30)	92,941,658.71	49,157,152	27,882,497	120,824,156	71,667,004	1,804,979	1.94	354
355	POLES AND FIXTURES		58-R4	(100)	206,167,678.41	75,792,149	206,167,679	412,335,357	336,543,208	7,796,789	3.78	355
356	OVERHEAD CONDUCTORS AND DEVICES		58-R4	(25)	186,370,956.53	70,594,342	46,592,739	232,963,696	162,369,354	4,732,319	2.54	356
359	ROADS AND TRAILS		70-R4	0	71,789.00	57,151	0	71,789	14,638	783	1.09	359
	TOTAL TRANSMISSION PLANT				775,126,231	274,879,350						

	DEPRECIABLE GROUP	Probable Retirement Year	Survivor Curve	Net Salvage Percent	Original Cost As of 12/31/2013	Book Depreciation Reserve	Interim Net Salvage Only Future Accruals	Total Accruals	Total Future Accruals	Calc Annual Accrual Amount	Staff Annual Accrual Rate %	FERC Acc
	DISTRIBUTION PLANT											
361	STRUCTURES AND IMPROVEMENTS		60-R2.5	(5)	17,602,770.55	6,480,485	880,138	18,482,909	12,002,424	314,950	1.79	361
362	STATION EQUIPMENT		60-R2.5	(5)	835,864,878.01	234,289,400	41,793,244	877,658,122	643,368,722	14,153,180	1.69	362
363	ENERGY STORAGE EQUIPMENT		10-L3	0	New Account & Depreciation rate assignment for distribution battery storage						11.76	363
364	POLES AND FIXTURES		47-R2.5	(100)	962,415,890.94	772,542,308	962,415,891	1,924,831,782	1,152,289,474	34,164,180	3.55	364
365	OVERHEAD CONDUCTORS AND DEVICES		50-R1	(50)	1,098,221,331.85	356,703,409	549,110,666	1,647,331,998	1,290,628,589	32,983,656	3.00	365
366	UBDERGROUND CONDUIT		70-R3	(50)	323,791,301.00	92,838,865	161,895,650	485,686,951	392,848,086	6,902,075	2.13	366
367	UBDERGROUND CONDUCTORS AND DEVICES		56-R2	(25)	648,868,136.96	206,878,989	162,217,034	811,085,171	604,206,182	14,200,698	2.19	367
368	LINE TRANSFORMER		41-R2.5	5	441,413,879.08	149,526,165	-22,070,694	419,343,185	269,817,020	10,423,440	2.36	368
369.1	OVERHEAD SERVICES		43-R2.5	(100)	178,734,409.79	230,578,927	178,734,410	357,468,820	126,889,893	4,247,645	2.38	369.1
369.2	UNDERGROUND SERVICES		55-R3	(90)	153,646,256.31	106,792,590	138,281,631	291,927,887	185,135,297	4,930,087	3.21	369.2
370	METERS		26-S0.5	0	102,802,474.36	40,909,460	0	102,802,474	61,893,014	4,078,929	3.97	370
371	INSTALLATION ON CUSTOMERS' PREMISES		25-O1	0	164,611.12	163,876	0	164,611	735	44	0.03	371
373	STREET LIGHTING AND SIGNAL SYSTEMS		36-S0	(40)	123,124,535.85	69,858,907	49,249,814	172,374,350	102,515,443	4,099,885	3.33	373
	TOTAL DISTRIBUTION PLANT				4,886,650,476	2,267,563,381						
	GENERAL PLANT											
390	STRUCTURES AND IMPROVEMENTS											
	MISCELLANEOUS STRUCTURES - OLD		55-R1.5	(5)	4,556,499.77	3,458,942	227,825	4,784,325	1,325,383	86,882	1.91	
	LARGE STRUCTURES		48-R1.5	(10)	216,978,888.64	66,090,825	21,697,889	238,676,778	172,585,953	4,986,915	2.30	
	TOTAL STRUCTURES				221,535,388	69,549,767						
390.05	STRUCTURES AND IMPROVE -TRAINING ASSETS		5-SQ	0	957,880.79	478,940	0	957,881	478,941	191,576	20.00	390.05
391	Office Furniture											
	Fully Accrued		Fully Accrued		2,463,781.82	2,463,782						
	Amortized		20-SQ	0	26,076,583.83	10,831,510	0	26,076,584	15,245,074	1,302,528	5.00	391
	Total Office Furniture				28,540,365.65	13,295,292						
391.1	MAINFRAME COMPUTERS		5-SQ	0	434,165.57	434,166		434,166	0	0	0.00	391.1
391.2	PERSONAL COMPUTERS											
	Fully Accrued		Fully Accrued		10,063,587.52	10,063,588						
	Amortized		5-SQ	0	11,339,953.88	5,262,016	0	11,339,954	6,077,938	2,268,207	20.00	391.2
	Total Personal Computers				21,403,541	15,325,604						
391.3	Office Equipment											
	Fully Accrued		Fully Accrued		2,360,031.21	2,360,031						
	Amortized		15-SQ	0	3,130,548.03	1,227,695	0	3,130,548	1,902,853	208,811	6.67	391.3
	Total Office equipment				5,490,579	3,587,726						

	DEPRECIABLE GROUP	Probable Retirement Year	Survivor Curve	Net Salvage Percent	Original Cost As of 12/31/2013	Book Depreciation Reserve	Interim Net Salvage Only Future Accruals	Total Accruals	Total Future Accruals	Calc Annual Accrual Amount	Staff Annual Accrual Rate %	FERC Acc
392	TRANSPORTATION EQUIPMENT		11-R1.5	10	115,624,075.52	36,765,388	-11,562,406	104,061,670	67,296,282	9,250,966	8.00	392
392.05	TRANSPORTATION EQUIPMENT - TRAINING ASSETS		5-SQ	0	287,010.27	143,505	0	287,010	143,505	57,402	20.00	392.05
393	Stores Equipment											
	Fully Accrued		Fully Accrued		91,645.94	91,646						
	Amortized		20-SQ	0	3,268,000.79	910,889	0	3,268,001	2,357,112	163,445	5.00	393
	Total Stores Equipment				3,359,646.73	1,002,535						
394	Tools, Shop & Garage Equipment											
	Fully Accrued		Fully Accrued		3,113,719.16	3,113,719						
	Amortized		20-SQ	0	19,218,859.50	5,745,964	0	19,218,860	13,472,896	961,171	5.00	394
	Total Tools, Shop & Garage Equipment				22,332,578.66	8,859,683						
394.05	Tools, Shop & Garage Equip - Training Assets		5-SQ	0	2,053,885.63	875,522	0	2,053,886	1,178,364	410,865	20.00	394.05
395	Laboratory Equipment		20-SQ	0	5,488,098.67	1,635,202	0	5,488,099	3,852,897	274,301	5.00	395
396	Power Operated Equipment		15-L2	15	12,934,096.82	2,852,362	-1,940,115	10,993,982	8,141,620	795,664	6.15	396
397	Communications Equipment											
	Fully Accrued		Fully Accrued		24,847,526.53	24,847,527						
	Amortized		15-SQ	0	55,909,016.60	19,954,792	0	55,909,017	35,954,225	3,731,538	5.00	397
	Total Communications Equipment				80,756,543.13	44,802,319						
397.05	Communications Equip - Training Assets		5-SQ	0	11,014.86	3,304	0	11,015	7,711	2,203	20.00	397.05
398	Miscellaneous Equipment											
	Fully Accrued		Fully Accrued		135,970.70	135,971						
	Amortized		20-SQ	0	1,055,520.45	303,334	0	1,055,520	752,186	52,790	5.00	398
	Total Miscellaneous Equipment				1,191,491.15	439,305						
	TOTAL GENERAL PLANT				522,400,363	200,050,619						
	TOTAL DEPRECIABLE ELECTRIC PLANT				14,426,213,311	6,241,433,682	2,832,328,260	17,204,034,036	11,017,107,890	412,673,943	2.86	
	UNRECOVERER RESERVE FOR AMORTIZATION											
391	Office Furniture					2,360,000						
391.1	MAINFRAME COMPUTERS					(102,065)						
391.2	PERSONAL COMPUTERS					9,903,000						
391.3	Office Equipment					297,900						
393	Stores Equipment					23,000						
394	Tools, Shop & Garage Equipment					1,112,000						
395	Laboratory Equipment					(830,000)						
397	Communications Equipment					12,195,000						
398	Miscellaneous Equipment					(31,700)						
	TOTAL UNRECOVERER RESERVE FOR AMORTIZATION					24,927,135						

APPENDIX 3,
SCHEDULE HEW-1

HAS BEEN DEEMED

HIGHLY CONFIDENTIAL

IN ITS ENTIRETY