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INDIANA UTILITY
REGULATORY COMMISSION

I&M Exhibit: _____

Cause No. 45576

**INDIANA MICHIGAN POWER COMPANY**

# PRE-FILED VERIFIED DIRECT TESTIMONY

**OF**

**JASON A. CASH**

## Content

**DIRECT TESTIMONY OF JASON A. CASH**
**ON BEHALF OF**
**INDIANA MICHIGAN POWER COMPANY**

## I. Introduction of Witness

**Q1. Please state your name and business address.**

My name is Jason A. Cash and my business address is 1 Riverside Plaza, Columbus, OH 43215.

**Q2. By whom are you employed and in what capacity?**

I am employed by American Electric Power Service Corporation (AEPSC) as an Accounting Senior Manager in Corporate Accounting. AEPSC supplies engineering, accounting, planning, advisory, and other services to the subsidiaries of the American Electric Power (AEP) system, one of which is Indiana Michigan Power Company (I&M or the Company).

**Q3. What are your responsibilities as an Accounting Senior Manager?**

My responsibilities include providing the AEP and affiliated companies with accounting support for regulatory filings, including the preparation of depreciation studies and testimony. I also monitor regulatory proceedings and legislation for accounting implications and assist in determining the appropriate regulatory accounting treatment.

**Q4. Briefly describe your educational background and professional experience.**

I graduated with a Bachelor of Science degree with a major in accounting from The Ohio State University in 2000. In 2000, I joined AEPSC and have held

several positions within the Accounting organization, including general ledger accounting and financial reporting for Ohio Power Company and AEPSC.

From 2008 through 2013, I worked in AEPSC's Transmission Accounting department where I was promoted to Supervisor of Transmission Accounting in 2013. From 2014 through 2019, I worked in AEPSC's Accounting Policy & Research department as a Staff Accountant and was later promoted to Senior Staff Accountant in 2019. In 2019, I was promoted to my current position of Accounting Senior Manager.

**Q5. Have you previously testified before any regulatory commissions?**

Yes. I have prepared depreciation studies and testified before the Indiana Utility Regulatory Commission (IURC or Commission) in Cause Nos. 44967 and 45235. I have also prepared depreciation studies or testified before the Oklahoma Corporation Commission, the Louisiana Public Service Commission, the Public Utility Commission of Texas, the Public Utilities Commission of Ohio, the Virginia State Corporation Commission, the Arkansas Public Service Commission, the Public Service Commission of West Virginia, the Michigan Public Service Commission, the Public Service Commission of Kentucky, the Tennessee Regulatory Authority, and the Federal Energy Regulatory Commission.

**Q6. Have you had any formal training relating to depreciation and utility accounting?**

Yes. I am a member of the Society of Depreciation Professionals (SDP) and was a former at-large director for the SDP. I have completed training courses offered by the SDP, which include Depreciation Fundamentals, Life and Net Salvage Analysis, and Analyzing the Life of Real World Property.

These training classes included topics such as introduction to plant and depreciation accounting, data requirements and collection, depreciation models, life cycle analysis, current regulatory issues, actuarial life analysis, net salvage analysis, and simulation life analysis.

## II. Purpose of Testimony

**Q7. What is the purpose of your testimony?**

The purpose of my testimony is to recommend revised depreciation accrual rates for I&M's electric plant in service based on a depreciation study for I&M's electric utility plant in service at December 31, 2020 (as adjusted, see below). Schedules I and II in the Depreciation Study Report (included as Attachment JAC-1) detail the results of the study. The depreciation rates determined by the study are intended to provide recovery of invested capital, cost of removal, and credit for salvage over the expected life of the property.

**Q8. Are you sponsoring any attachments?**

Yes, I am sponsoring the following attachments:

- Attachment JAC-1: Depreciation Study Report.
- Attachment JAC-2: Brandenburg Industrial Service Company's conceptual dismantling study performed for the Rockport Plant.
- Attachment JAC-3: Sargent and Lundy's conceptual dismantling studies performed for the Company's hydroelectric (or hydraulic) facilities.

**Q9. Are you sponsoring any workpapers?**

Yes, I am sponsoring the following workpapers:

- WP-JAC-1: Depreciation Study Workpapers
- WP-JAC-2: I&M Meter Depreciation Calculation
- WP-JAC-3: Figure JAC-1 of Direct Testimony

**Q10. Were the attachments and workpapers that you sponsor prepared by you or under your direction and supervision?**

Yes.

**Q11. Please summarize your testimony.**

The depreciation study I prepared supports revisions to the depreciation rates and accruals previously approved by the Commission, resulting in an annual depreciation expense increase of $10,500,192 on a Total Company basis. The primary driver of this increase is investment at the Cook Nuclear Plant.

My study includes expected production plant investment through the Test Year to properly match depreciation rates with plant in service when rates become effective in 2022. It also reflects (i) reasonable assumptions for salvage and dismantlement, (ii) a consolidated "whole plant" approach for the Rockport units that has the effect of reducing the depreciation rates associated with certain investments at that plant, and (iii) the same approach to Account 370 (Meters) that was approved by the Commission in I&M's last rate case. The revised depreciation rates are reasonable and should be approved.

## III. Depreciation Study Overview

**Q12. What is the basis for I&M's current depreciation rates?**

I&M's current depreciation rates are based on a Commission Order received in Cause No. 45235 where the Commission approved the Company's current

steam production, nuclear production, hydroelectric production, other production, transmission, distribution and general plant depreciation rates.

**Q13. How do the depreciation rates and annual accruals as a result of your study compare with I&M's current rates and accruals?**

*Figure JAC-1* compares the rates and accruals of I&M with those of the study. This comparison is based on expected Total Company depreciable plant balances for Steam Production Plant prior to December 31, 2022 (before the end of the Rockport Unit 2 lease), for Nuclear, Hydraulic, and Other Production Plant at December 31, 2022, and Total Company depreciable plant balances for all other functions at December 31, 2020.

**Figure JAC-1. Composite Depreciation Rates and Accruals**

Steam Production Plant - Plant In Service prior to December 31, 2022
Nuclear, Hydraulic and Other Production Plant - Plant In Service at December 31, 2022
Plant In Service at December 31, 2020 (All Other Functions)

| | Existing | | Study | | |
|---|---|---|---|---|---|
| Functional Plant Group | Rates | Accruals ($) | Rates | Accruals ($) | Difference ($) |
| Steam Production[1] | 8.16% | 93,485,397 | 7.99% | 91,491,790 | (1,993,607) |
| Nuclear Production | 4.10% | 150,259,300 | 4.52% | 165,645,446 | 15,386,146 |
| Hydraulic Production | 2.74% | 2,041,834 | 4.33% | 3,223,644 | 1,181,810 |
| Other Production | 5.29% | 1,968,059 | 5.37% | 1,999,612 | 31,553 |
| Transmission | 2.48% | 41,667,464 | 2.67% | 44,835,980 | 3,168,516 |
| Distribution | 3.48% | 89,903,251 | 3.17% | 81,896,932 | (8,006,319) |
| General | 3.55% | 5,795,047 | 4.00% | 6,527,140 | 732,093 |
| Total Depreciable Plant | 4.12% | 385,120,352 | 4.23% | 395,620,544 | 10,500,192 |

[1] The existing Steam Production accrual amount and rate reflect the annual depreciation for Rockport, based on existing rates, prior to the Rockport Unit 2 lease ending and the owned investment of Rockport Unit 2 being retired from the Company's books. This provides a more accurate representation of the change in annual Rockport depreciation expense, before the end of the Rockport Unit 2 lease. Schedule II of the Depreciation Study Report shows a comparison using Total Company depreciable plant balances for Steam Production Plant at December 31, 2022.

*Figure JAC-1* shows a comparison of the depreciation accruals *before* the end of the Rockport Unit 2 Lease, producing a decrease of approximately $2.0 million on a Total Company basis for Steam Production Plant.

**Q14. What do you recommend with respect to I&M's depreciation accrual rates?**

Based on the results of the study, I am recommending an overall increase in I&M's depreciation accrual rates, to be made effective upon implementation of new base rates.

For purposes of comparison, applying my recommended I&M Indiana rates to total Company depreciable plant in service as of December 31, 2020 (as adjusted, as discussed later in my testimony) would produce an increase in annual depreciation expense of $10,500,192. The primary driver of this increase is in the Nuclear function, as discussed later in my testimony.

## IV. Study Methods and Procedures

**Q15. Please explain the definition of depreciation as used in preparing your depreciation study.**

The definition of depreciation that I used in preparing the study is the same that is used by FERC and the National Association of Regulatory Utility Commissioners:

> *Depreciation, as applied to depreciable electric plant, means the loss in service value not restored by current maintenance, incurred in connection with the consumption or prospective retirement of electric plant in the course of service from causes which are known to be in current operation and against which the utility is not protected by insurance.*
>
> *Among the causes to be given consideration are wear and tear,*

*decay, action of the elements, inadequacy, obsolescence, changes in the art, changes in demand and requirements of public authorities.*

*Net salvage value means the salvage value of property retired less the cost of removal. Service value means the difference between original cost and net salvage value of electric plant.*[2]

**Q16. Please explain the methods and procedures you used in preparing your depreciation study.**

The methods and procedures are fully described in Attachment JAC-1, the Depreciation Study Report. In summary, all of the property included in the Depreciation Study Report was considered on a group plan. Under the group plan, depreciation is accrued upon the basis of the original cost of all property included in each depreciable plant group instead of individual items of property.

Upon retirement of any depreciable property, its full cost, less any net salvage realized, is charged to the accumulated provision for depreciation regardless of the age of the particular item retired. Also under this plan, the dollars in each primary plant account are considered as a separate group for depreciation accounting purposes and an annual depreciation rate for each account is determined.

In this study, the plant groups consisted of the individual primary plant accounts for Production, Transmission, Distribution, and General Plant property. The depreciation rates were calculated by the Average Remaining Life Method, which is the same method that was used to calculate I&M's current depreciation rates. The Average Remaining Life method recovers the original cost of the plant (adjusted for net salvage) less accumulated depreciation over the average remaining life of the plant.

For Production Plant, the generating unit retirement dates and the interim retirement history for the individual plant accounts were used to determine the

[2] 18 C.F.R. pt. 101 ("Definitions" ¶¶ 12, 19, 37).

average service lives and the remaining lives of the plants. The average service lives for the Company's Transmission, Distribution, and General Plant were determined using statistical procedures similar to those used in the insurance industry in studies of human mortality. The historical retirement experience of property groups was studied, and retirement characteristics of the property were described using the Iowa-type retirement dispersion curves.

Net salvage for each property group was determined based on actual historical experience for Production, Transmission, Distribution, and General Plant accounts. In addition, Production plant included terminal retirement net salvage amounts for Steam and Hydraulic Production Plant.

To determine terminal net salvage for Steam and Hydraulic Production Plant, my depreciation study used the conceptual dismantling cost estimates that are reflected in I&M's current depreciation rates. For I&M's Rockport Plant, the estimate was prepared by Brandenburg Industrial Service Company (Brandenburg). For I&M's hydraulic production plants, the estimates were prepared by Sargent & Lundy (S&L). Both Brandenburg and S&L are independent engineering firms.

**Q17. Do you consider the dismantling studies used in your depreciation study to be reliable and of a type generally relied upon by persons such as yourself during the course of studying depreciation rates?**

Yes.

**Q18. Do the previous estimates prepared by Brandenburg and S&L remain as reliable sources for the purposes of calculating terminal net salvage for the Company's Rockport and hydraulic plants?**

Yes. Because major additions, such as the selective catalytic reduction system (SCR) that was installed on Rockport Unit 2, are included with these previous

estimates, they continue to provide reasonable bases for calculating the terminal net salvage on each plant.

A copy of the Brandenburg dismantling study is included with my testimony as Attachment JAC-2. A copy of the S&L dismantling studies are included with my testimony as Attachment JAC-3.

The recommended depreciation rates include the estimated final removal cost and expected terminal net salvage amounts specific to each of the Company's steam and hydraulic generating stations at their estimated retirement dates.

**Q19. Do the estimates prepared by Brandenburg and S&L include amounts for contingencies that may occur during the projects?**

Brandenburg's estimate for the Rockport Plant does not contain an amount for contingency. However, the S&L estimates for the Company's Hydro facilities each contain an estimated amount for contingency.

**Q20. Are the contingency costs included with S&L's demolition cost estimates reasonable and appropriate?**

Yes. An amount for contingency is "intended to cover unknowns," and is included in the estimates because "experience teaches that almost every complex project, such as demolition of a generation station, ends up with unknowns."[3]

Contingencies included in the demolition cost estimates are necessary to account for the unknowns anticipated to occur during these complex projects.

[3] Re *PSI Energy, Inc.*, Cause No. 42359, p. 67, 2004 WL 1493966 (IURC May 18, 2004).

**Q21. Has the IURC previously accepted S&L's use of a contingency factor in the preparation of conceptual demolition cost estimates for I&M?**

Yes. On page 105 of its Order in Cause No. 44075, the Commission accepted S&L's use of a contingency factor and stated: "*We find the contingencies used in I&M's demolition estimates to be reasonable and similar to the factors we approved in Cause No. 43526.*"

In its Cause No 45235 Order, the Commission also stated:

> *The Commission has previously recognized the inclusion of a contingency factor in demolition studies for purposes of computing final terminal salvage. As Mr. Cash testified, the Commission accepted the inclusion of contingencies in Cause No. 44075. 44075 Order, p. 105.*
>
> *In the 44075 Order, the Commission cited the Order in Northern Indiana Pub. Serv. Co., Cause No. 43526, p. 54,2010 WL 3444546, 284 P.U.R. 4th 369 (IURC August 25,2010), wherein the Commission approved the inclusion of contingency in the calculation of depreciation.*
>
> *We find Mr. D. Garrett and Mr. Rutter, without saying so, are asking the Commission to disregard our prior acceptance of contingency in I&M's demolition estimates without showing us why this change is warranted. The Commission accepts Petitioner's proposed contingency factor.*[4]

**Q22. Please explain how you determined terminal net salvage as of the retirement year.**

Brandenburg provided terminal net salvage amounts, excluding any asbestos, ash pond, or landfill-type removal costs, stated at a 2018 price level. For the purposes of developing depreciation rates, I needed the terminal net salvage amount at the time of the unit retirement. Thus, I applied a 2.20% inflation rate

[4] Page 32.

factor to the net salvage amounts provided by the Brandenburg study to determine the terminal net salvage amount at Rockport Unit 1's retirement year.

Similarly, the S&L study provided terminal net salvage amounts stated at a 2015 price level. To estimate the cost at each unit's retirement date, I applied the same 2.20% inflation rate factor to the net salvage amounts provided by the S&L study in order to determine the terminal net salvage amount for each hydraulic plant at the plant's retirement year. The terminal net salvage amounts after inflation were used in the calculation of net salvage percentages in the depreciation study.

**Q23. What is the source of the inflation rate used for this purpose?**

The 2.20% inflation rate was taken from the *Livingston Survey*, a December 18, 2020 publication of the research department of the Federal Reserve Bank of Philadelphia. The *Livingston Survey* provides a long-term inflation outlook projecting an inflation rate for a ten-year period.

**Q24. Has the Company applied an inflation rate or escalation factor to its final demolition estimates in previous depreciation studies that have been filed with this Commission?**

Yes. The Company has consistently applied an inflation rate or escalation factor to its generation plant demolition estimates in prior depreciation studies filed with the Commission. Additionally, the Company has consistently used the *Livingston Survey* as its source for obtaining the long-term inflation rate used in its depreciation studies.

**Q25. Has the IURC accepted the Company's application of an escalation factor to develop a terminal net salvage amount to be used for the purpose of calculating depreciation rates?**

Yes. In Cause No. 44075, the Commission considered the Company's application of a 2.5% escalation factor to the Company's demolition estimates for Steam Production Plant and made the following conclusions (on page 105 of its Order) before ultimately accepting the Company's proposed depreciation rates in that Cause:

> *Therefore, we find that inflation should be factored into dismantlement cost estimates and reject the OUCC's proposal to restate costs of removal at present value.*
>
> *…*
>
> *We therefore reject Mr. Selecky's proposal to modify the depreciation rates using lower estimates of future inflation.*

The Commission accepted I&M's depreciation rates in Cause No. 44555 and Cause No. 44967, both of which included inflating I&M's final demolition costs to a future level.

In Cause No. 45235, the Commission once again agreed with the Company's application of an inflation factor to its final demolition cost estimates. On page 33 of its final order in Cause No. 45235, the Commission stated "*The Commission finds the inclusion of the escalation factor at issue was appropriate based upon Mr. Cash's rebuttal testimony.*"

**Q26. Did the depreciation study exclude the cost to remove asbestos and to cover ash ponds and landfills?**

Yes. The costs to remove asbestos and to cover ash ponds and landfills are included in the Company's ARO accounting. The depreciation and accretion on

these AROs are incorporated into the cost of providing service, which is discussed in more detail by Company witness Ross.

**Q27. Were there any changes in the depreciation parameters for I&M's plant in service since the depreciation study presented in Cause No. 45235 that you would like to discuss?**

Yes. In addition to the Company's electric utility plant in service and accumulated depreciation on the books at December 31, 2020, the depreciation study includes an adjustment for the 2021-2022 forecast additions to plant in service at Rockport, Cook, and the Company's hydraulic and solar generating stations to reflect a forward-looking test period for the Company's steam, nuclear, hydraulic and other production plant investment.

The depreciation study also includes a calculation to estimate a corresponding adjustment to accumulated depreciation for all of production plant that reflects an additional two years of depreciation accrued through 2022. The adjustments made to original cost and accumulated depreciation are as follows:

- Rockport Plant – Original cost $33.3 million; accumulated depreciation $186.4 million.
- Cook Plant – Original cost $217.0 million; accumulated depreciation $290.5 million.
- Hydraulic Production Plant – Original cost $19.1 million; accumulated depreciation $3.0 million.
- Other Production Plant - Accumulated depreciation $3.9 million

The total forecast additions for production plant included in the depreciation study total approximately $269.4 million, including $217.0 million of forecasted additions for the Cook Plant related to the Life Cycle Management (LCM) project. Company witness Lies discusses capital investment at Cook.

The forecast additions to Rockport, Cook, and the Company's hydraulic and solar generating station plant balances and accumulated depreciation were included with the depreciation study because production plant uses finite end-of-life dates in the depreciation study to calculate depreciation rates.

In comparison, transmission, distribution and general plant use an average service life and average remaining life to calculate depreciation rates in the depreciation study. Including the forecast additions and accumulated depreciation will ensure that accurate depreciation rates are established for each generating station when rates become effective in 2022.

Establishing depreciation rates in this manner better supports the full depreciation of such assets and better aligns customer rates with the remaining service life of each generating station while reducing the extent to which the costs will need to be reflected in rates after the assets are no longer in service.

**Q28. Were there any changes in the depreciation parameters for I&M's Rockport Plant since the depreciation study presented in Cause No. 45235?**

Yes. In this depreciation study, all of the Company's investment in Rockport Unit 1 and certain leasehold improvements made at Rockport Unit 2 are presented together as the Rockport Plant and depreciation rates were calculated for each utility account used by the Rockport Plant.

The certain leasehold improvements at Rockport Unit 2 include the Company's share of the owned non-severable leasehold improvements made to the unit, including the dry sorbent injection system (DSI) installed in 2015 and the SCR installed in 2021.

**Q29. Why was the change made to calculate depreciation rates for the Rockport Plant as a whole versus calculating them separately for Rockport Units 1 &**

**2 as presented in previous depreciation studies filed with this Commission?**

The change was made primarily to summarize all of the investment made at the Rockport Plant, including the SCR, DSI and actived carbon injection (ACI) investments made on each Rockport Unit, and calculate an individual depreciation rate for each utility account used by the Rockport Plant through 2028.

Summarizing the depreciation rates by each utility account establishes depreciation of the existing Rockport Plant through 2028, or the remaining life of Rockport Unit 1, considers the lease ending for Rockport Unit 2 in December 2022, and also incorporates the remaining net book value associated with the certain leasehold improvements of Rockport Unit 2 at December 2022.

The depreciation rates approved in Cause No. 45235 established depreciation rates for the investment in Rockport Unit 2 through 2028 for the Unit 2 SCR, through 2025 for the Unit 2 DSI, and through 2022 for the other investment at Unit 2. The proposed depreciation rates in this case depreciate the remaining net book value of all Rockport Plant investment at December 31, 2022 through 2028.

## Advanced Metering Infrastructure

**Q30. Please explain the methodology you used to establish a depreciation rate for Account 370.**

The Company has decided to transition to AMI meters across its service territory over four years, or 2021 through 2024. This requires the Company to retire the meters currently installed over the same time period. As a result, a depreciation rate was calculated in the current depreciation study to reflect the retirement of the meters that are currently installed and the installation of new AMI meters.

The depreciation rate calculation for Account 370 uses the currently approved depreciation rate through 2021, the expected retirement of the current meters by year, and the projected costs to install AMI Meters by year. Please see WP-JAC-2 for the depreciation rate calculation of Account 370.

Using updated investment and timing information from the Company's plans to implement AMI Meters, the Company is proposing a depreciation rate in this case of 10.08% as compared to the 9.27% depreciation rate approved in Cause No. 45235.

**Q31. Did you calculate a depreciation rate for Account 370 in the same manner as you did for the depreciation rate that was calculated and approved for the same account in Cause No. 45235?**

Yes. The calculation of the depreciation rate for Account 370 was performed in exactly the same manner that was calculated and approved in Cause No. 45235. I merely updated the information in the calculation to reflect the Company's currently expected investment and timeframe to implement the new meters across its service territory. As a result, a slight change to the approved depreciation rate for Account 370 is being proposed in this case which represents the change in meter technology from AMR to AMI type meters.

**Q32. Over what time period does the Company calculate depreciation rates for Account 370 to reflect the installation of AMI meters?**

The depreciation rates that were calculated for Account 370 are based on a 15 year estimated useful life for AMI meters after the meters are installed.

**Q33. Is recovery of the remaining value of property, plant and equipment that has been retired a normal utility ratemaking practice?**

Yes. Recovery of the remaining value of a generating station or Transmission, Distribution and General property is normal utility ratemaking practice and this practice follows FERC Electric Plant Instruction No. 10 “Additions and Retirements of Electric Plant”, paragraph (2), which states:

> *“(2) When a retirement unit is retired from electric plant, with or without replacement, the book cost thereof shall be credited to the electric plant account in which it is included, determined in the manner set forth in paragraph D, below.*
>
> *If the retirement is of a depreciable class, the book cost of the unit retired and credited to electric plant shall be charged to the accumulated provision for depreciation applicable to such property.”*

**Q34. Could the Company have requested a depreciation rate for meters using the current meter plant balances and the retirement history of Account 370?**

Yes. However, instead of proposing two separate rates for meters, one depreciation rate for the current AMR meter investment through 2024 and one depreciation rate for its AMI meter investment over a 15 year expected useful life, the Company is proposing a single depreciation rate for Account 370 that reflects the change in technology that will occur while also depreciating its current investment of AMR meters over the life of the AMI meters.

## V. Study Results

**Q35. Please explain the results of your study for Steam Production Plant.**

As shown in *Figure JAC-1*, a decrease of approximately $2.0 million is expected for Steam Production Plant on a Total Company basis. This is mainly due to depreciating the expected remaining balance of Rockport Unit 2 through 2028.

**Q36. Please explain the results of your study for Nuclear Production Plant.**

The composite rate for Nuclear Production Plant increased from 4.10% to 4.52% mainly due to a $146.9 million increase in the depreciable plant in service balance since the 2018 depreciation study. The increase in depreciable nuclear plant in service since 2018 is mostly due to the LCM Project, which is discussed in detail by Company witness Lies.

**Q37. Please explain the results of your study for Hydraulic Production Plant.**

The composite rate for Hydraulic Production Plant increased from 2.74% to 4.33% due to a $17.4 million increase in the depreciable plant in service balance since the 2018 depreciation study.

**Q38. Please explain the results of your study for Other Production Plant.**

The composite depreciation rate for Other Production Plant increased slightly from 5.29% to 5.37% due to a $0.3 million increase in the depreciable plant in service balance since the 2018 depreciation study.

**Q39. Please explain the results of your study for Transmission Plant.**

The depreciation rate for Transmission Plant increased from 2.48% to 2.67% due to increases in the net salvage ratio for three accounts (Accounts 353, 354,

and 355) and decreases in the average service life for four accounts (Accounts 352, 353, 355 and 358).

The depreciation rate increase was partially offset by an increase in the average service lives for three accounts (Accounts 354, 356 and 357) and decreases in the net salvage ratio for three accounts (Accounts 352, 356 and 358).

As shown on Schedule III of the depreciation study report, the Iowa Curves selected are the same as those approved in Cause No. 45235, with the exception of accounts 352 and 358. The Actuarial analysis performed for Account 352 indicated that a better fitting curve should be selected for the account and conservative judgment was used for the curve and life selected for account 358.

**Q40. Please explain the results of your study for Distribution Plant.**

The depreciation rate for Distribution Plant decreased from 3.48% to 3.17% due to increases in the average service life for eight accounts (Accounts 364, 365, 366, 367, 368, 369, 371, and 373) and a decrease in the net salvage ratio for Account 370.

The decrease was offset by increases in the net salvage ratio for seven accounts (Accounts 361, 362, 364, 365, 368, 369 and 373), decreases in the average service life of two accounts (Accounts 361 and 362), and updating the depreciation rate that was calculated for Account 370.

As shown on Schedule III of the depreciation study report, the Iowa Curves selected are the same as those approved in Cause No. 45235, with the exception of accounts 361,362 and 367 where the Actuarial analysis performed for each account indicated a better fitting curve should be used.

**Q41. Please explain the results of your study for General Plant.**

The depreciation rate for General Plant increased from 3.55% to 4.00% due to increases in the net salvage ratio for three accounts (Accounts 390, 391, and 397) and a decrease in the average service life of Account 390. A better fitting L1.0 Iowa Curve was selected during the Actuarial analysis for Account 390, resulting in a lower average service life.

**Q42. Does this conclude your pre-filed verified direct testimony?**

Yes.

## VERIFICATION

I, Jason A. Cash, Accounting Senior Manager in Corporate Accounting of American Electric Power Service Corporation, affirm under penalties of perjury that the foregoing representations are true and correct to the best of my knowledge, information, and belief.

Date: 6/20/21

Jason A. Cash

# INDIANA MICHIGAN POWER COMPANY

# DEPRECIATION STUDY REPORT

# OF

# ELECTRIC PLANT IN SERVICE

# AT DECEMBER 31, 2020

# DEPRECIATION STUDY REPORT

## Table of Contents

# I. INTRODUCTION

This report presents the results of a depreciation study of Indiana Michigan Power Company's (I&M) depreciable electric utility plant in service at December 31, 2020 adjusted to include 2021-2022 forecasted additions to production plant. The study was preformed by Jason A. Cash, Accounting Senior Manager at American Electric Power Service Corporation (AEPSC). The purpose of the depreciation study was to develop appropriate annual depreciation accrual rates for each of the primary plant accounts that comprise the functional groups for which I&M computes its annual depreciation expense.

The recommended depreciation rates are based on the Average Remaining Life Method of computing depreciation. Further explanation of this method is contained in Section II of this report.

The definition of depreciation used in this Study is the same as that used by the Federal Energy Regulatory Commission (FERC) and the National Association of Regulatory Utility Commissioners:

> "Depreciation, as applied to depreciable electric plant, means the loss in service value not restored by current maintenance, incurred in connection with the consumption or prospective retirement of electric plant in the course of service from causes which are known to be in current operation and against which the utility is not protected by insurance. Among the causes to be given consideration are wear and tear, decay, action of the elements, inadequacy, obsolescence, changes in the art, changes in demand and requirements of public authorities."
>
> "Service value means the difference between original cost and the

> net salvage value (net salvage value means the salvage value of the property retired less the cost of removal) of the electric plant." (FERC Accounting and Reporting Requirements for Public Utilities and Licensees, ¶15.001.)

SCHEDULE I of this report shows the recommended depreciation accrual rates by primary plant accounts and composited to functional plant classifications. SCHEDULE II compares depreciation expense using existing rates approved by the Commission and rates recommended by the depreciation study. SCHEDULE III shows a comparison of the current and existing mortality characteristics that were used to compute the recommended depreciation rates for Transmission, Distribution and General Plant functions. SCHEDULE IV lists I&M's generating stations and includes the year installed (in service) and the estimated retirement year. A simple comparison of I&M's current rates and accruals and the study rates and accruals is shown below on Figure JAC-1. Figure JAC-1 is based on expected Total Company depreciable plant balances for Steam Production Plant prior to December 31, 2022 (before the end of the Rockport Unit 2 lease), for Nuclear, Hydraulic, and Other Production Plant at December 31, 2022, and Total Company depreciable plant balances for all other functions at December 31, 2020:

**Figure JAC-1**
Steam Production Plant - Plant In Service prior to December 31, 2022
Nuclear, Hydraulic and Other Production Plant - Plant In Service at December 31, 2022
Plant In Service at December 31, 2020 (All Other Functions)

| | Existing | | Study | | |
|---|---|---|---|---|---|
| Functional Plant Group | Rates | Accruals ($) | Rates | Accruals ($) | Difference ($) |
| Steam Production (1) | 8.16% | 93,485,397 | 7.99% | 91,491,790 | (1,993,607) |
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| Transmission | 2.48% | 41,667,464 | 2.67% | 44,835,980 | 3,168,516 |
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| General | 3.55% | 5,795,047 | 4.00% | 6,527,140 | 732,093 |
| Total Depreciable Plant | 4.12% | 385,120,352 | 4.23% | 395,620,544 | 10,500,192 |

**Note:** The existing Steam Production accrual amount and rate reflect the annual depreciation for Rockport, based on existing rates, prior to the Rockport Unit 2 lease ending and the owned investment of Rockport Unit 2 being retired from the Company's books. This provides a more accurate representation of the change in annual Rockport depreciation expense, before the end of the Rockport Unit 2 lease. Schedule II of the Depreciation Study Report shows a comparison using Total Company depreciable plant balances for Steam Production Plant at December 31, 2022.

Figure JAC-1 shows a comparison of the depreciation accruals before the end of the Rockport Unit 2 Lease, producing a decrease of approximately $2.0 million on a Total Company basis for Steam Production Plant and an overall Total Company increase of $10,500,192.

## II. DISCUSSION OF METHODS AND PROCEDURES USED IN THE STUDY

### 1. Group Method

All of the depreciable property included in this report was considered on a group plan. Under the group plan, depreciation expense is accrued upon the basis of the original cost of all property included in each depreciable plant account. Upon retirement of any depreciable property, its full cost, less any net salvage realized,

is charged to the accrued depreciation reserve regardless of the age of the particular item retired. Also, under this plan, the dollars in each primary plant account are considered as a separate group for depreciation accounting purposes and an annual depreciation rate for each account is determined. The annual accruals by primary account were then summed, to arrive at the total accrual for each functional group. The total accrual divided by the original cost yields the functional group accrual rate.

2. Annual Depreciation Rates Using the Average Remaining Life Method

I&M's current depreciation rates are based on the Average Remaining Life Method. The Average Remaining Life Method recovers the original cost of the plant, adjusted for net salvage, less accumulated depreciation, over the average remaining life of the plant. By this method, the annual depreciation rate for each account is determined on the following basis:

$$\text{Annual Depreciation Expense} = \frac{(\text{Orig. Cost} \times \text{Net Salvage Ratio}) - \text{Accumulated Depreciation}}{\text{Average Remaining Life}}$$

$$\text{Annual Depreciation Rate} = \frac{\text{Annual Depreciation Expense}}{\text{Original Cost}}$$

3. Methods of Life Analysis

Depending upon the type of property and the nature of the data available from the property accounting records, one of three life analyses was used to arrive at the historically realized mortality characteristics and service lives of the depreciable plant investments. These methods are identified and described as follows:

Life Span Analysis

The life span analysis was employed for Production Plant. I&M's investment in production plant includes steam, nuclear, hydraulic and solar generating plants. The life-span method of analysis is particularly suited to specific location property, such as a generating plant, where all of the surviving investments are likely to be retired in total at a future date.

The key elements in the life span analysis are the age of the surviving investments, the projected retirement date of the facility and the expected interim retirements. Interim retirements are those that are expected to occur between the date of the depreciation study and the expected final retirement date of the generating plant. Examples of interim retirements include fans, pumps, motors, a set of boiler tubes, a turbine rotor, etc. The interim retirement history for each primary production plant account was analyzed and the results of those analyses were used to project future interim retirements.

The age of the surviving investments was obtained from I&M's property accounting records. The retirement dates used in the life-span analysis for Steam Production Plant (Rockport) have not been updated from the retirement dates that were presented in Cause No. 45235. This depreciation study recommends summarizing the investment made at the Rockport Plant, including the SCR, DSI and ACI investments made on each Rockport Unit, and calculate an individual depreciation rate for each utility account used by the Rockport Plant through 2028. For Nuclear and Hydraulic Production plants, the retirement dates are based on the Nuclear Regulatory Commission (NRC) and FERC license expiration dates for the plants, except for the Constantine hydraulic plant where I&M is in the process of filing for 30 year license extension with FERC. For Other Production Plant, the 20 year life for the Company's four solar facilities was based on I&M's expected

useful life for the facilities as approved by the Commission in the order in Cause No. 44511.

A discussion of the life analyses for Steam, Nuclear, Hydraulic and Other Production (solar) Plant follows:

Steam Production Plant

I&M's depreciable investment in Steam Production Plant is for the Rockport Generation plant. The Rockport Plant is located on the Ohio River near Rockport Indiana and consists of two generating units. Rockport Unit 2 is a leased unit and the depreciable property that is included in this report for Unit 2 consists of equipment items that are owned by I&M at the leased unit.

The Rockport generating units and their capacities are as follows (also shown on SCHEDULE IV – Estimated Generation Plant Retirement Dates):

| Plant | Unit | Rating | Commercial Operating Date |
|---|---|---|---|
| Rockport | 1 | 1,300 MW | 1984 |
| Rockport | 2 | 1,300 MW | 1989 |

I&M continues to evaluate each of the Rockport generating units and estimated the following retirement dates for each of the units:

| Plant | Unit | Retirement Date |
|---|---|---|
| Rockport | 1 | 2028 |
| Rockport | 2 | 2022 |

The estimated retirement date for Rockport Unit 1 is 2028 and is the same retirement date that was proposed for Rockport Unit 1 in Cause No. 45235. The estimated retirement date for certain leasehold improvements made at Rockport Unit 2 is 2022 and is based on the expiration date of the lease. As previously mentioned, this depreciation study recommends summarizing the investment made at the Rockport Plant and calculating an individual depreciation rate for each utility account used by the Rockport Plant through 2028.

Nuclear Production Plant

I&M's depreciable investment in nuclear production plant is the Cook plant that is located on Lake Michigan at Bridgman, Michigan. The Cook generating units and their capacities are as follows:

| Plant | Unit | Rating | Commercial Operating Date |
|---|---|---|---|
| Cook | 1 | 1,020 MW | 1975 |
| Cook | 2 | 1,090 MW | 1978 |

In 2005, the NRC granted I&M a 20 year license extension to Cook Plant which established the currently approved estimated retirement dates of 2034 for Unit 1 and 2037 for Unit 2.

In 2013, the Company received Commission approval in Cause No. 44812 to complete a number of capital additions to the Cook Plant under a Life Cycle Management (LCM) project. The LCM project is intended to allow the Cook Plant to continue to operate during the 20 year license extension that was granted in 2005. Cook Plant's increase in depreciable plant in service of $146.9 million since the last depreciation study (with

adjusted December 31, 2018 plant in service balances) was mostly due to capital additions related to the LCM project.

Hydraulic Production Plant

I&M's investment in Hydraulic Production Plant includes Berrien Springs, Buchanan, Constantine, Elkhart, Mottville and Twin Branch plants. The plants have a number of generating units that were placed into commercial operation over the period from 1904 through 1923. All the plants are located on the St. Joseph River in either the state of Indiana or Michigan.

The generating plants and their capacities are as follows:

| Plant | Capacity | First Unit's Commercial Operating Date | FERC License Expiration |
|---|---|---|---|
| Berrien Springs | 7.2 MW | 1908 | * |
| Buchanan | 4.1 MW | 1919 | 2036 |
| Constantine | 1.2 MW | 1921 | 2053 |
| Elkhart | 3.4 MW | 1913 | 2030 |
| Mottville | 1.7 MW | 1923 | 2033 |
| Twin Branch | 4.8 MW | 1904 | 2036 |

* Not FERC licensed. The retirement date was estimated to be the same date as Buchanan and Twin Branch which is 2036.

I&M is in the process of filing with FERC to relicense the Constantine Plant and continue operating the plant for at least an additional 30 year period.

Other Production Plant

I&M's depreciable investment in Other Production Plant at December 2016 is for the Deer Creek, Olive, Twin Branch and Watervliet Solar Plants. The Deer Creek Solar Plant is located just south of Marion, Indiana and is generating up to 2.5 megawatts of electricity. The Olive Solar Plant is located in New Carlisle, Indiana and is generating up to 5.0 megawatts of electricity. The Twin Branch Solar Plant is located in Mishawaka, Indiana and is generating up to 2.6 megawatts of electricity. The Watervliet Solar Plant is located in Watervliet, MI and is generating up to 4.6 megawatts of electricity.

The generating plants and their capacities are as follows:

| Plant | Capacity | Commercial Operating Date |
|---|---|---|
| Deer Creek | 2.5 MW | 2015 |
| Olive | 5.0 MW | 2016 |
| Twin Branch | 2.6 MW | 2016 |
| Watervliet | 4.6 MW | 2016 |

Actuarial Analysis – Transmission, Distribution and General Plant

This method of analyzing past experience represents the application to industrial property of statistical procedures developed in the life insurance field for investigating human mortality. It is distinguished from other methods of life estimation by the requirement that it is necessary to know the age of the property at the time of its retirement and the age of survivors, or plant remaining in service; that is, the installation date must be known for each particular retirement and for each particular survivor.

The application of this method involves the statistical procedure known as

the "annual rate method" of analysis. This procedure relates the retirements during each age interval to the exposures at the beginning of that interval, the ratio of these being the annual retirement ratio. Subtracting each retirement ratio from unity yields a sequence of annual survival ratios from which a survivor curve can be determined. This is accomplished by the consecutive multiplication of the survivor ratios. The length of this curve depends primarily upon the age of the oldest property. Normally, if the period of years from the inception of the account to the time of the study is short in relation to the expected maximum life of the property, an incomplete or stub survivor curve results.

While there are a number of acceptable methods of smoothing and extending this stub survivor curve in order to compute the area under it from which the average life is determined, the well-known Iowa Type Curve Method was used in this study.

By this procedure, instead of mathematically smoothing and projecting the stub survivor curve to determine the average life of the group, it was assumed that the stub curve would have the same mortality characteristics as the type curve selected. The selection of the appropriate type curve and average life is accomplished by plotting the stub curve, superimposing on it Iowa curves of the various types and average lives drawn to the same scale, and then determining which Iowa type curve and average life best matches the stub.

The Actuarial Method of Life Analysis was used for the following accounts:

352.0 Transmission Structures & Improvements
353.0 Transmission Station Equipment
358.0 Underground Conductor and Devices
361.0 Distribution Structures & Improvements
362.0 Distribution Station Equipment
367.0 Underground Conductor
390.0 General Structures & Improvements

The result of the actuarial analysis for the above accounts is detailed in the depreciation study work papers.

Simulated Plant Record Analysis – Transmission Plant

The "Simulated Plant Record" (SPR) method designates a class of statistical techniques that provide an estimate of the age distribution, mortality dispersion and average service life of property accounts whose recorded history provides no indication of the age of the property units when retired from service. For each such account, the available property records usually reveal only the annual gross additions, annual retirements and balances with no indication of the age of either plant retirements or annual plant balances. For the accounts using this methodology, the "Balances method" of analysis was used.

The SPR Balances Method is a trial and error procedure that attempts to duplicate the annual balance of a plant account by distributing the actual annual gross additions over time according to an assumed mortality distribution. Specifically, the dollars remaining in service at any date are estimated by

multiplying each year's additions by the successive proportion surviving at each age as given by the assumed survivor characteristics. For a given year, the balance indicated is the accumulation of survivors from all vintages and this is compared with the actual book balance. This process is repeated for different survivor curves and average life combinations until a pattern is discovered which produces a series of "simulated balances" most nearly equaling the actual balances shown in a company's books.

This determination is based on the distribution producing the minimum sum of squared differences between the simulated balance and the actual balances over a test period of years.

The iterative nature of the simulated methods makes them ideally suited for computerized analysis. For each analysis of a given property account, the computer program provides a single page summary containing the results of each analysis indicating the "best fit" based on criteria selected by the user.

The results of the analysis using the Balance Method is shown in the depreciation study work papers. The analysis also shows the value of the Index of Variation of the difference that is calculated according to the Balances Method where a lower value for the Index of Variation indicates better agreement with the actual data.

The SPR Method of Life Analysis was utilized for the following accounts:

354.0 Transmission Towers & Fixtures

355.0 Transmission Poles & Fixtures

356.0 Transmission OH Conductor & Devices

357.0 Transmission Underground Conduit

364.0 Distribution Poles, Towers & Fixtures

365.0 Distribution Overhead Conductor & Devices

366.0 Distribution Underground Conduit

368.0 Distribution Line Transformers

369.0 Distribution Services

371.0 Distribution Installations on Customers' Premises

373.0 Distribution Street Lighting and Signal Systems

Vintage Year Accounting – General Equipment

In 1998, the Company began using a vintage year accounting method for general plant accounts 391 to 398 in accordance with Federal Energy Regulatory Commission Accounting Release Number 15 (AR-15). This accounting method requires amortization of vintage groups of property over their useful lives. AR-15 also requires that property be retired when it meets its average service life.

As a result, my recommendation for these accounts is that the current useful life approved by the Commission be retained and used to continue depreciation of the account balances.

4. Final Selection of Average Life and Curve Type

The final selection of average life and curve type for each depreciable plant account analyzed by the Actuarial and SPR Methods was primarily based on the results of the mortality analyses of past retirement history.

## III. NET SALVAGE

1. Net Salvage - Steam Production Plant

The net salvage analysis for steam production plant included a review of the Company's experienced functional interim retirement, salvage and removal history for the period 1954-2020. This interim salvage analysis calculated life to date salvage, removal and net salvage percentages as compared to original cost retirements.

While this type of analysis was used to determine the net salvage applicable to interim retirements for steam production plant, the most significant net salvage amount for generating plants occurs at the end of their life. Therefore, to assist in establishing total net salvage applicable to I&M's steam generating plant, I&M contracted Brandenburg Industrial Service Company (Brandenburg) to update the conceptual demolition cost estimate for the Rockport Plant that was included in I&M's last depreciation study and incorporated in I&M's current depreciation rates. The updated Brandenburg cost estimate to demolish the Rockport Plant is based on current (2018) price levels which were inflated to the retirement date of Rockport Unit 1 (2028) in the depreciation study. The estimate of demolition costs was included in the net salvage ratios for Steam Production Plant. Brandenburg's demolition costs incorporated in the depreciation study totals do not include Asset Retirement Obligation (ARO) amounts associated with the removal of asbestos or any cost associated with the final disposition of Rockport landfills and ash ponds since accretion and depreciation associated with these AROs is included separately in I&M's cost of service.

2. Net Salvage - Nuclear Production Plant

The net salvage analysis for nuclear production plant included a review of the Company's experienced functional interim retirement, salvage and removal history for the period 1995-2020. Prior to June 2007, I&M maintained salvage and removal costs at the functional plant level, rather than by primary plant accounts. To determine gross salvage, gross removal and net salvage percentages for individual plant accounts, original cost retirements, salvage and removal were detailed by account for the period 1995 through 2020. Total functional salvage and removal were allocated to individual plant accounts using original cost retirements for the period 1995 to 2007 and were listed as directly charged for 2008 through 2020. The gross salvage and cost of removal percentages were calculated for the twenty-six year time period (1995 to 2020) for each account. The salvage and removal percentages for each account were then netted to determine a net salvage percentage for each account.

Costs associated with the final retirement of I&M's Cook nuclear plant are included in the Company's nuclear decommissioning and ARO accounting and are not included in the depreciation study.

3. Net Salvage - Hydraulic Production Plant

The net salvage analysis for hydraulic production plant included a review of the Company's experienced functional interim retirement, salvage and removal history for the period 2001-2020. This interim salvage analysis calculates annual interim salvage, removal and net salvage percentages as compared to original cost retirements.

As with the depreciation study that was performed for Cause Nos. Cause Nos. 44967 and 45235, I&M relied on the same conceptual terminal demolition cost estimates that were provided by Sargent & Lundy (S&L) for each of the

Company's hydraulic plants in that Cause. Since the S&L cost estimates to demolish the hydraulic plants are based on 2015 price levels, the S&L cost estimates were inflated to each plant's estimated retirement date in the depreciation study. I&M's current depreciation study uses the interim net salvage analysis mentioned above plus the S&L conceptual terminal demolition cost estimates to determine the total net salvage amount to include in the depreciation rate calculation for each of the Company's Hydraulic Production Plants.

4. Net Salvage - Other Production Plant

As with the depreciation study that was performed for Cause Nos. 44967 and 45235, the net salvage analysis for other production plant included an estimated cost for demolition at each site and an estimated cost to recycle the number of panels located at each site.

5. Net Salvage – Transmission, Distribution and General Plant

The net salvage percentages used in this report for Transmission, Distribution and General Plant are expressed as a percent of original cost and are based on the Company's experience combined with the judgment of the analyst. Prior to June 2007, I&M maintained salvage and removal costs at the functional plant level, rather than by primary plant accounts. To determine gross salvage, gross removal and net salvage percentages for individual plant accounts, original cost retirements, salvage and removal were detailed by account for the period 1995 through 2020. Total functional salvage and removal were allocated to individual plant accounts using original cost retirements for the period 1995 to 2007 and were listed as directly charged for 2008 through 2020. The gross salvage and cost of removal percentages were calculated for the twenty-six year time period

(1995 to 2020) for each account. The salvage and removal percentages for each account were then netted to determine a net salvage percentage for each account.

The net salvage percentages were converted to net salvage ratios (1 minus the net salvage percentage) which appear in Column IV on SCHEDULE I. The net salvage percentages were used to determine the total amount to be recovered through depreciation. The same net salvage percentages were also reflected in the determination of the calculated depreciation requirement, which was used to allocate accumulated depreciation at the functional group to the accounts comprising each group.

6. Net Salvage – Ratios

The net salvage ratios shown in Column IV on SCHEDULE I of this report may be explained as follows:

a. Where the ratio is shown as unity (1.00), it was assumed that the net salvage in that particular account would be zero.

b. Where the ratio is less than unity, it was assumed that the salvage exceeded the removal costs. For example, if the net salvage were 20%, the net salvage ratio would be expressed as .80.

c. Where the ratio is greater than unity, it was assumed that the salvage was less than the cost of removal. For example, if the net salvage were minus 5%, the net salvage ratio would be expressed as 1.05.

## IV. CALCULATION OF DEPRECIATION REQUIREMENT

The accumulated depreciation by functional group was allocated to individual plant accounts based on the calculation of a depreciation requirement (theoretical reserve) for each plant account using the average service life, curve type and net salvage amount recommended in this study.

## V. STUDY RESULTS

Production, Transmission, Distribution and General plant results are discussed below. In addition, Transmission, Distribution and General Plant average service life, retirement dispersion pattern and net salvage percentages used to calculate each primary plant account depreciation rate are shown on SCHEDULE III. The mortality characteristics and net salvage values for the current rates are also shown. Changes to the mortality characteristics follow trends shown by historical retirement experience. Gross salvage and gross cost of removal percentages were largely based on the history of each account.

### Steam Production Plant

As shown in Figure JAC-1, a decrease of approximately $2.0 million is expected for Steam Production Plant is expected on a Total Company basis. This is mainly due to depreciating the expected remaining balance of Rockport Unit 2 through 2028.

### Nuclear Production Plant

The composite rate for Nuclear Production Plant increased from 4.10% to 4.52% mainly due to a $146.9 million increase in the depreciable plant in service

balance since the 2018 depreciation study. The increase in depreciable nuclear plant in service since 2018 is mostly due to I&M's LCM program which was detailed in the Company's 2013 order in Cause No. 44812. The LCM program is intended to perform work necessary to allow the Cook Units 1 and 2 to reach the end of their renewed license period in 2034 (Unit 1) and 2037 (Unit 2).

Hydraulic Production Plant

The composite rate for Hydraulic Production Plant increased from 2.74% to 4.33% due a $17.4 million increase in the depreciable plant in service balance since the 2018 depreciation study.

Other Production Plant

The composite depreciation rate for Other Production Plant increased slightly from 5.29% to 5.37% due to a $0.3 million increase in the depreciable plant in service balance since the 2018 depreciation study.

Transmission Plant

The depreciation rate for Transmission Plant increased from 2.48% to 2.67% due to increases in the net salvage ratio for three accounts (Accounts 353, 354, and 355) and decreases in the average service life for four accounts (Accounts 352, 353, 355 and 358). The depreciation rate increase was partially offset by an increase in the average service lives for three accounts (Accounts 354, 356 and 357) and decreases in the net salvage ratio for three accounts (Accounts 352, 356 and 358). As shown on Schedule III of the depreciation study report, the Iowa Curves selected are the same as those approved in Cause No. 45235, with the exception of accounts 352 and 358. The Actuarial analysis performed for Account 352 indicated that a better fitting curve should be selected

for the account and conservative judgment was used for the curve and life selected for account 358.

Distribution Plant

The depreciation rate for Distribution Plant decreased from 3.48% to 3.17% due to increases in the average service life for eight accounts (Accounts 364, 365, 366, 367, 368, 369, 371, and 373) and a decrease in the net salvage ratio for Account 370. The decrease was offset by increases in the net salvage ratio for seven accounts (Accounts 361, 362, 364, 365, 368, 369 and 373), decreases in the average service life of two accounts (Accounts 361 and 362), and updating the depreciation rate that was calculated for Account 370. As shown on Schedule III of the depreciation study report, the Iowa Curves selected are the same as those approved in Cause No. 45235, with the exception of accounts 361,362 and 367 where the Actuarial analysis performed for each account indicated a better fitting curve should be used.

General Plant

The depreciation rate for General Plant increased from 3.55% to 4.00% due to increases in the net salvage ratio for three accounts (Accounts 390, 391, and 397) and a decrease in the average service life of Account 390. A better fitting L1.0 Iowa Curve was selected during the Actuarial analysis for Account 390, resulting in a lower average service life.

# SCHEDULE I – EXPLANATION OF COLUMN HEADINGS

SCHEDULE I shows the determination of the recommended annual depreciation accrual rate by primary plant accounts by the straight line remaining life method. An explanation of the schedule follows:

| | | |
|---|---|---|
| Column I | - | Account number. |
| Column II | - | Account title. |
| Column III | - | Original Cost at December 31, 2016, adjusted to include 2017 projected additions |
| Column IV | - | Net Salvage Ratio. |
| Column V | - | Total to be Recovered (Column III) * (Column IV). |
| Column VI | - | Calculated Depreciation Requirement. |
| Column VII | - | Allocated Accumulated Depreciation – I&M's accumulated depreciation (adjusted book reserve) spread to each account on the basis of the Calculated Depreciation Requirement shown in Column VI. |
| Column VIII | - | Remaining to be Recovered (Column V - Column VII). |
| Column IX | - | Average Remaining Life. |
| Column X | - | Recommended Annual Accrual Amount. |
| Column XI | - | Recommended Annual Accrual Percent or Depreciation Rate (Column X/Column III). |

**INDIANA MICHIGAN POWER COMPANY**
**SCHEDULE I - CALCULATION OF DEPRECIATION RATES BY THE REMAINING LIFE METHOD**
**BASED ON DEPRECIABLE PLANT IN SERVICE AT DECEMBER 31, 2020 (1)**
**AVERAGE LIFE GROUP (ALG) METHOD ACCRUAL RATES**

IN

| ACCOUNT NO. | ACCOUNT TITLE | ORIGINAL COST | NET SALVG RATIO | TOTAL TO BE RECOVERED | CALCULATED DEPRECIATION REQUIREMENT | ALLOCATED ACCUMULATED DEPRECIATION | REMAINING TO BE RECOVERED | AVG REMAIN LIFE | RECOMMENDED ANNUAL ACCRUAL AMOUNT | RECOMMENDED ANNUAL ACCRUAL % |
|---|---|---|---|---|---|---|---|---|---|---|
| (I) | (II) | (III) | (IV) | (V) | (VI) | (VII) | (VIII) | (IX) | (X) | (XI) |
| **STEAM PRODUCTION PLANT** | | | | | | | | | | |
| **Rockport** | | | | | | | | | | |
| 311.0 | Structures & Improvements | 103,081,792 | 1.02 | 105,143,428 | 90,063,864 | 53,340,105 | 51,803,323 | 5.47 | 9,470,443 | 9.19% |
| 312.0 | Boiler Plant Equipment | 646,499,630 | 1.02 | 659,429,623 | 531,021,903 | 314,496,432 | 344,933,191 | 5.39 | 63,995,026 | 9.90% |
| 314.0 | Turbogenerator Units | 110,198,824 | 1.02 | 112,402,800 | 92,010,973 | 54,493,275 | 57,909,525 | 5.35 | 10,824,210 | 9.82% |
| 315.0 | Accessory Electrical Equipment | 60,038,956 | 1.02 | 61,239,735 | 53,196,660 | 31,505,593 | 29,734,142 | 5.44 | 5,465,835 | 9.10% |
| 316.0 | Miscellaneous Power Plant Equip. | 17,952,020 | 1.02 | 18,311,060 | 15,204,150 | 9,004,621 | 9,306,439 | 5.36 | 1,736,276 | 9.67% |
| | Total Rockport | 937,771,222 | 1.02 | 956,526,646 | 781,497,550 | 462,840,025 | 493,686,620 | 5.40 | 91,491,790 | 9.76% |
| **Total Steam Production Plant** | | **937,771,222** | **1.02** | **956,526,646** | **781,497,550** | **462,840,025** | **493,686,620** | **5.40** | **91,491,790** | **9.76%** |
| **NUCLEAR PRODUCTION PLANT** | | | | | | | | | | |
| **Cook Unit 1** | | | | | | | | | | |
| 321.0 | Structures & Improvements | 86,734,372 | 1.01 | 87,601,716 | 67,751,167 | 52,347,711 | 35,254,005 | 11.28 | 3,125,355 | 3.60% |
| 322.0 | Reactor Plant Equipment | 782,729,686 | 1.03 | 806,211,577 | 503,156,645 | 388,762,289 | 417,449,288 | 10.95 | 38,123,223 | 4.87% |
| 323.0 | Turbogenerator Units | 312,897,355 | 1.03 | 322,284,276 | 187,150,479 | 144,601,188 | 177,683,088 | 10.45 | 17,003,166 | 5.43% |
| 324.0 | Accessory Electrical Equipment | 137,248,173 | 1.00 | 137,248,173 | 91,626,880 | 70,795,200 | 66,452,973 | 11.13 | 5,970,618 | 4.35% |
| 325.0 | Miscellaneous Power Plant Equip. | 36,218,603 | 1.00 | 36,218,603 | 22,654,736 | 17,504,106 | 18,714,497 | 10.97 | 1,705,971 | 4.71% |
| | Total Cook Unit 1 | 1,355,828,189 | 1.02 | 1,389,564,344 | 872,339,907 | 674,010,494 | 715,553,850 | 10.85 | 65,928,332 | 4.86% |
| **Cook Unit 2** | | | | | | | | | | |
| 321.0 | Structures & Improvements | 378,680,285 | 1.02 | 386,253,891 | 249,249,636 | 192,581,892 | 193,671,999 | 14.15 | 13,687,067 | 3.61% |
| 322.0 | Reactor Plant Equipment | 1,053,868,998 | 1.03 | 1,085,485,068 | 600,707,437 | 464,134,580 | 621,350,488 | 13.62 | 45,620,447 | 4.33% |
| 323.0 | Turbogenerator Units | 425,843,325 | 1.04 | 442,877,058 | 215,681,127 | 166,645,297 | 276,231,761 | 12.83 | 21,530,145 | 5.06% |
| 324.0 | Accessory Electrical Equipment | 200,678,427 | 1.00 | 200,678,427 | 106,821,127 | 82,534,984 | 118,143,443 | 13.91 | 8,493,418 | 4.23% |
| 325.0 | Miscellaneous Power Plant Equip. | 248,016,731 | 1.00 | 248,016,731 | 137,376,467 | 106,143,465 | 141,873,266 | 13.66 | 10,386,037 | 4.19% |
| | Total Cook Unit 2 | 2,307,087,766 | 1.02 | 2,363,311,175 | 1,309,835,794 | 1,012,040,218 | 1,351,270,957 | 13.55 | 99,717,114 | 4.32% |
| **Total Nuclear Production Plant** | | **3,662,915,955** | **1.02** | **3,752,875,519** | **2,182,175,701** | **1,686,050,712** | **2,066,824,807** | **12.48** | **165,645,446** | **4.52%** |
| **HYDRAULIC PRODUCTION PLANT** | | | | | | | | | | |
| **Berrien Springs** | | | | | | | | | | |
| 331.0 | Structures & Improvements | 696,548 | 1.04 | 724,410 | 423,273 | 341,708 | 382,702 | 13.34 | 28,688 | 4.12% |
| 332.0 | Reservoirs, Dams & Waterways | 6,320,266 | 1.04 | 6,573,077 | 4,453,917 | 3,595,649 | 2,977,428 | 13.40 | 222,196 | 3.52% |
| 333.0 | Waterwheels, Turbines & Generators | 8,386,954 | 1.04 | 8,722,432 | 5,477,687 | 4,422,138 | 4,300,294 | 13.21 | 325,533 | 3.88% |
| 334.0 | Accessory Electrical Equip. | 1,417,718 | 1.04 | 1,474,427 | 966,929 | 780,602 | 693,825 | 13.04 | 53,207 | 3.75% |
| 335.0 | Misc. Power Plant Equip. | 929,404 | 1.04 | 966,580 | 575,405 | 464,525 | 502,055 | 13.29 | 37,777 | 4.06% |
| | Total Berrien Springs | 17,750,890 | 1.04 | 18,460,926 | 11,897,211 | 9,604,622 | 8,856,304 | 13.27 | 667,402 | 3.76% |
| **Buchanan** | | | | | | | | | | |
| 331.0 | Structures & Improvements | 660,195 | 1.05 | 693,205 | 406,287 | 327,996 | 365,209 | 13.34 | 27,377 | 4.15% |
| 332.0 | Reservoirs, Dams & Waterways | 5,154,683 | 1.05 | 5,412,417 | 3,825,496 | 3,088,324 | 2,324,093 | 13.40 | 173,440 | 3.36% |
| 333.0 | Waterwheels, Turbines & Generators | 1,414,445 | 1.05 | 1,485,167 | 1,076,004 | 868,658 | 616,509 | 13.21 | 46,670 | 3.30% |
| 334.0 | Accessory Electrical Equip. | 1,108,771 | 1.05 | 1,164,210 | 808,427 | 652,643 | 511,567 | 13.04 | 39,231 | 3.54% |
| 335.0 | Misc. Power Plant Equip. | 311,833 | 1.05 | 327,425 | 192,788 | 155,638 | 171,787 | 13.29 | 12,926 | 4.15% |
| | Total Buchanan | 8,649,927 | 1.05 | 9,082,423 | 6,309,002 | 5,093,259 | 3,989,164 | 13.31 | 299,643 | 3.46% |

**INDIANA MICHIGAN POWER COMPANY**
**SCHEDULE I - CALCULATION OF DEPRECIATION RATES BY THE REMAINING LIFE METHOD**
**BASED ON DEPRECIABLE PLANT IN SERVICE AT DECEMBER 31, 2020 (1)**
**AVERAGE LIFE GROUP (ALG) METHOD ACCRUAL RATES**

IN

| ACCOUNT NO. (I) | ACCOUNT TITLE (II) | ORIGINAL COST (III) | NET SALVG RATIO (IV) | TOTAL TO BE RECOVERED (V) | CALCULATED DEPRECIATION REQUIREMENT (VI) | ALLOCATED ACCUMULATED DEPRECIATION (VII) | REMAINING TO BE RECOVERED (VIII) | AVG REMAIN LIFE (IX) | RECOMMENDED ANNUAL ACCRUAL AMOUNT (X) | RECOMMENDED ANNUAL ACCRUAL % (XI) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Elkhart** | | | | | | | | | | |
| 331.0 | Structures & Improvements | 1,632,902 | 1.03 | 1,681,889 | 1,183,377 | 955,341 | 726,548 | 7.42 | 97,918 | 6.00% |
| 332.0 | Reservoirs, Dams & Waterways | 11,027,557 | 1.03 | 11,358,384 | 7,468,137 | 6,029,029 | 5,329,355 | 7.45 | 715,350 | 6.49% |
| 333.0 | Waterwheels, Turbines & Generators | 875,459 | 1.03 | 901,723 | 699,106 | 564,389 | 337,334 | 7.35 | 45,896 | 5.24% |
| 334.0 | Accessory Electrical Equip. | 766,670 | 1.03 | 789,670 | 607,967 | 490,812 | 298,858 | 7.27 | 41,108 | 5.36% |
| 335.0 | Misc. Power Plant Equip. | 342,337 | 1.03 | 352,607 | 207,932 | 167,864 | 184,743 | 7.39 | 24,999 | 7.30% |
| | Total Elkhart | 14,644,925 | 1.03 | 15,084,273 | 10,166,519 | 8,207,435 | 6,876,838 | 7.43 | 925,270 | 6.32% |
| **Twin Branch** | | | | | | | | | | |
| 331.0 | Structures & Improvements | 1,428,784 | 1.05 | 1,500,223 | 757,013 | 611,137 | 889,086 | 13.34 | 66,648 | 4.66% |
| 332.0 | Reservoirs, Dams & Waterways | 8,416,861 | 1.05 | 8,837,704 | 5,373,324 | 4,337,886 | 4,499,818 | 13.40 | 335,807 | 3.99% |
| 333.0 | Waterwheels, Turbines & Generators | 9,909,128 | 1.05 | 10,404,584 | 5,960,786 | 4,812,145 | 5,592,439 | 13.21 | 423,349 | 4.27% |
| 334.0 | Accessory Electrical Equip. | 2,876,083 | 1.05 | 3,019,887 | 1,784,149 | 1,440,344 | 1,579,543 | 13.04 | 121,131 | 4.21% |
| 335.0 | Misc. Power Plant Equip. | 1,005,606 | 1.05 | 1,055,886 | 474,832 | 383,332 | 672,554 | 13.29 | 50,606 | 5.03% |
| | Total Twin Branch | 23,636,462 | 1.05 | 24,818,285 | 14,350,104 | 11,584,844 | 13,233,441 | 13.27 | 997,541 | 4.22% |
| **Constantine** | | | | | | | | | | |
| 331.0 | Structures & Improvements | 470,900 | 1.17 | 550,953 | 243,136 | 196,284 | 354,669 | 29.66 | 11,958 | 2.54% |
| 332.0 | Reservoirs, Dams & Waterways | 1,653,789 | 1.17 | 1,934,933 | 898,583 | 725,426 | 1,209,507 | 29.99 | 40,330 | 2.44% |
| 333.0 | Waterwheels, Turbines & Generators | 993,032 | 1.17 | 1,161,847 | 582,783 | 470,481 | 691,366 | 29.01 | 23,832 | 2.40% |
| 334.0 | Accessory Electrical Equip. | 671,796 | 1.17 | 786,001 | 257,651 | 208,002 | 577,999 | 28.18 | 20,511 | 3.05% |
| 335.0 | Misc. Power Plant Equip. | 475,641 | 1.17 | 556,500 | 155,263 | 125,344 | 431,156 | 29.43 | 14,650 | 3.08% |
| | Total Constantine | 4,265,158 | 1.17 | 4,990,235 | 2,137,416 | 1,725,537 | 3,264,698 | 29.34 | 111,281 | 2.61% |
| **Mottville** | | | | | | | | | | |
| 331.0 | Structures & Improvements | 797,060 | 1.04 | 828,942 | 550,003 | 444,018 | 384,924 | 10.40 | 37,012 | 4.64% |
| 332.0 | Reservoirs, Dams & Waterways | 2,312,828 | 1.04 | 2,405,341 | 1,759,748 | 1,420,645 | 984,696 | 10.44 | 94,320 | 4.08% |
| 333.0 | Waterwheels, Turbines & Generators | 639,576 | 1.04 | 665,159 | 507,583 | 409,772 | 255,387 | 10.32 | 24,747 | 3.87% |
| 334.0 | Accessory Electrical Equip. | 772,571 | 1.04 | 803,474 | 549,415 | 443,543 | 359,931 | 10.22 | 35,218 | 4.56% |
| 335.0 | Misc. Power Plant Equip. | 409,136 | 1.04 | 425,501 | 240,706 | 194,322 | 231,179 | 10.37 | 22,293 | 5.45% |
| 336.0 | Roads, Railroads & Bridges | 902 | 1.04 | 938 | 796 | 643 | 295 | 10.38 | 28 | 3.15% |
| | Total Mottville | 4,932,073 | 1.04 | 5,129,356 | 3,608,251 | 2,912,943 | 2,216,413 | 10.38 | 213,618 | 4.33% |
| **Crew Service Center** | | | | | | | | | | |
| 331.0 | Structures & Improvements | 417,303 | 1.05 | 438,168 | 291,864 | 235,622 | 202,546 | 29.66 | 6,829 | 1.64% |
| 335.0 | Misc. Power Plant Equip. | 126,865 | 1.05 | 133,208 | 89,929 | 72,600 | 60,608 | 29.43 | 2,059 | 1.62% |
| | Total Crew Service Center | 544,168 | 1.05 | 571,376 | 381,793 | 308,222 | 263,154 | 29.61 | 8,888 | 1.63% |
| **Total Hydraulic Production Plant** | | **74,423,603** | **1.05** | **78,136,874** | **48,850,296** | **39,436,861** | **38,700,012** | **12.01** | **3,223,644** | **4.33%** |

**INDIANA MICHIGAN POWER COMPANY**
**SCHEDULE I - CALCULATION OF DEPRECIATION RATES BY THE REMAINING LIFE METHOD**
**BASED ON DEPRECIABLE PLANT IN SERVICE AT DECEMBER 31, 2020 (1)**
**AVERAGE LIFE GROUP (ALG) METHOD ACCRUAL RATES**

IN

| ACCOUNT NO. | ACCOUNT TITLE | ORIGINAL COST | NET SALVG RATIO | TOTAL TO BE RECOVERED | CALCULATED DEPRECIATION REQUIREMENT | ALLOCATED ACCUMULATED DEPRECIATION | REMAINING TO BE RECOVERED | AVG REMAIN LIFE | RECOMMENDED ANNUAL ACCRUAL AMOUNT | RECOMMENDED ANNUAL ACCRUAL % |
|---|---|---|---|---|---|---|---|---|---|---|
| (I) | (II) | (III) | (IV) | (V) | (VI) | (VII) | (VIII) | (IX) | (X) | (XI) |
| **OTHER PRODUCTION PLANT** | | | | | | | | | | |
| **Deer Creek Solar Facility** | | | | | | | | | | |
| 344.0 | Generators | 5,668,204 | 1.03 | 5,838,250 | 2,189,344 | 2,027,991 | 3,810,259 | 12.50 | 304,821 | 5.38% |
| 345.0 | Accessory Electric Equip. | 720,502 | 1.03 | 742,117 | 162,301 | 150,340 | 591,777 | 12.50 | 47,342 | 6.57% |
| 346.0 | Misc. Power Plant Equip. | 10,893 | 1.03 | 11,220 | 1,659 | 1,537 | 9,683 | 12.50 | 775 | 7.11% |
| | Total Deer Creek Solar Facility | 6,399,599 | | 6,591,587 | 2,353,304 | 2,179,868 | 4,411,719 | 12.50 | 352,938 | 5.51% |
| **Olive Solar Facility** | | | | | | | | | | |
| 341.0 | Structures & Improvements | 376,687 | 1.03 | 387,988 | 126,096 | 116,803 | 271,185 | 13.50 | 20,088 | 5.33% |
| 344.0 | Generators | 11,184,837 | 1.03 | 11,520,382 | 3,744,124 | 3,468,187 | 8,052,195 | 13.50 | 596,459 | 5.33% |
| 345.0 | Accessory Electric Equip. | 269,062 | 1.03 | 277,134 | 90,069 | 83,431 | 193,703 | 13.50 | 14,348 | 5.33% |
| 346.0 | Misc. Power Plant Equip. | 215,250 | 1.03 | 221,708 | 72,055 | 66,745 | 154,963 | 13.50 | 11,479 | 5.33% |
| | Total Olive Solar Facility | 12,045,836 | 1.03 | 12,407,211 | 4,032,344 | 3,735,166 | 8,672,045 | 13.50 | 642,374 | 5.33% |
| **Twin Branch Solar Facility** | | | | | | | | | | |
| 344.0 | Generators | 6,955,324 | 1.04 | 7,233,537 | 2,350,900 | 2,177,641 | 5,055,896 | 13.50 | 374,511 | 5.38% |
| **Watervliet Facility** | | | | | | | | | | |
| 341.0 | Structures & Improvements | 358,237 | 1.03 | 368,984 | 119,920 | 111,082 | 257,902 | 13.50 | 19,104 | 5.33% |
| 344.0 | Generators | 11,107,366 | 1.03 | 11,440,587 | 3,718,191 | 3,444,164 | 7,996,423 | 13.50 | 592,328 | 5.33% |
| 346.0 | Misc. Power Plant Equip. | 343,931 | 1.03 | 354,249 | 114,883 | 106,416 | 247,833 | 13.50 | 18,358 | 5.34% |
| | Total Watervliet Facility | 11,809,534 | 1.03 | 12,163,820 | 3,952,994 | 3,661,662 | 8,502,158 | 13.50 | 629,789 | 5.33% |
| **Total Other Production Plant** | | **37,210,293** | 1.03 | **38,396,155** | **12,689,542** | **11,754,335** | **26,641,818** | 13.32 | **1,999,612** | **5.37%** |
| **Total Production Plant** | | **4,712,321,073** | **1.02** | **4,825,935,194** | **3,025,213,089** | **2,200,081,933** | **2,625,853,257** | **10.01** | **262,360,492** | **5.57%** |
| **TRANSMISSION PLANT** | | | | | | | | | | |
| 350.1 | Land Rights | 62,292,873 | 1.00 | 62,292,873 | 23,350,156 | 17,804,684 | 44,488,189 | 40.64 | 1,094,690 | 1.76% |
| 352.0 | Structures & Improvements | 52,265,232 | 1.10 | 57,491,755 | 7,849,551 | 5,985,346 | 51,506,409 | 56.13 | 917,627 | 1.76% |
| 353.0 | Station Equipment | 826,489,176 | 1.10 | 909,138,094 | 213,734,540 | 162,974,326 | 746,163,768 | 33.66 | 22,167,670 | 2.68% |
| 354.0 | Towers & Fixtures | 230,452,983 | 1.39 | 320,329,646 | 191,173,868 | 145,771,629 | 174,558,017 | 26.61 | 6,559,865 | 2.85% |
| 355.0 | Poles & Fixtures | 208,136,265 | 1.64 | 341,343,475 | 44,409,633 | 33,862,706 | 307,480,769 | 43.49 | 7,070,149 | 3.40% |
| 356.0 | OH Conductor & Devices | 294,558,395 | 1.35 | 397,653,833 | 159,649,845 | 121,734,305 | 275,919,528 | 40.10 | 6,880,786 | 2.34% |
| 357.0 | Underground Conduit | 2,241,687 | 1.00 | 2,241,687 | 1,117,374 | 852,007 | 1,389,680 | 27.59 | 50,369 | 2.25% |
| 358.0 | Underground Conductor | 4,522,363 | 1.13 | 5,110,270 | 1,464,317 | 1,116,554 | 3,993,716 | 42.81 | 93,289 | 2.06% |
| 359.0 | Roads and Trails | 91,159 | 1.00 | 91,159 | 25,925 | 19,768 | 71,391 | 46.51 | 1,535 | 1.68% |
| **Total Transmission Plant** | | **1,681,050,133** | **1.25** | **2,095,692,792** | **642,775,209** | **490,121,325** | **1,605,571,467** | **35.81** | **44,835,980** | **2.67%** |

**INDIANA MICHIGAN POWER COMPANY**
**SCHEDULE I - CALCULATION OF DEPRECIATION RATES BY THE REMAINING LIFE METHOD**
**BASED ON DEPRECIABLE PLANT IN SERVICE AT DECEMBER 31, 2020 (1)**
**AVERAGE LIFE GROUP (ALG) METHOD ACCRUAL RATES**

IN

| ACCOUNT NO. | ACCOUNT TITLE | ORIGINAL COST | NET SALVG RATIO | TOTAL TO BE RECOVERED | CALCULATED DEPRECIATION REQUIREMENT | ALLOCATED ACCUMULATED DEPRECIATION | REMAINING TO BE RECOVERED | AVG REMAIN LIFE | RECOMMENDED ANNUAL ACCRUAL AMOUNT | RECOMMENDED ANNUAL ACCRUAL % |
|---|---|---|---|---|---|---|---|---|---|---|
| (I) | (II) | (III) | (IV) | (V) | (VI) | (VII) | (VIII) | (IX) | (X) | (XI) |
| **DISTRIBUTION PLANT - IN** | | | | | | | | | | |
| 360.1 | Land Rights | 10,926,039 | 1.00 | 10,926,039 | 2,388,029 | 2,947,585 | 7,978,454 | 50.61 | 157,646 | 1.44% |
| 361.0 | Structures & Improvements | 32,691,043 | 1.25 | 40,863,804 | 3,686,322 | 3,066,234 | 37,797,570 | 58.94 | 641,289 | 1.96% |
| 362.0 | Station Equipment | 379,401,090 | 1.12 | 424,929,221 | 51,766,238 | 34,619,804 | 390,309,417 | 40.16 | 9,718,860 | 2.56% |
| 363.0 | Storage Battery Equipment | 5,606,730 | 1.00 | 5,606,730 | 4,242,655 | 3,747,078 | 1,859,652 | 3.65 | 509,494 | 9.09% |
| 364.0 | Poles, Towers, & Fixtures | 252,111,755 | 1.87 | 471,448,982 | 83,961,086 | 112,061,327 | 359,387,655 | 33.33 | 10,782,708 | 4.28% |
| 365.0 | Overhead Conductor & Devices | 399,931,378 | 1.16 | 463,920,398 | 74,997,865 | 90,991,491 | 372,928,907 | 32.63 | 11,429,020 | 2.86% |
| 366.0 | Underground Conduit | 144,882,340 | 1.00 | 144,882,340 | 21,257,149 | 22,768,052 | 122,114,288 | 50.84 | 2,401,933 | 1.66% |
| 367.0 | Underground Conductor | 255,708,978 | 1.00 | 255,708,978 | 48,263,147 | 43,352,417 | 212,356,561 | 42.40 | 5,008,409 | 1.96% |
| 368.0 | Line Transformers | 318,204,324 | 1.08 | 343,660,670 | 98,466,817 | 134,226,451 | 209,434,219 | 19.24 | 10,885,354 | 3.42% |
| 369.0 | Services | 166,556,147 | 1.24 | 206,529,622 | 49,502,488 | 60,380,012 | 146,149,610 | 33.12 | 4,412,730 | 2.65% |
| 370.0 | Meters (3) | 76,493,447 | 1.20 | 91,792,136 | 40,860,844 | 40,860,844 | 50,931,292 | **(3)** | 7,710,539 | 10.08% |
| 371.0 | Installations on Custs. Prem. | 20,434,795 | 1.23 | 25,134,798 | 7,560,590 | 13,489,503 | 11,645,295 | 11.64 | 1,000,455 | 4.90% |
| 373.0 | Street Lighting & Signal Sys. | 18,113,668 | 1.18 | 21,374,128 | 9,749,457 | 12,452,701 | 8,921,427 | 13.12 | 679,987 | 3.75% |
| **Total Distribution Plant - IN** | | **2,081,061,734** | **1.20** | **2,506,777,846** | **496,702,687** | **574,963,499** | **1,931,814,347** | **29.57** | **65,338,424** | **3.14%** |
| **DISTRIBUTION PLANT - MI** | | | | | | | | | | |
| 360.1 | Land Rights | 6,056,743 | 1.00 | 6,056,743 | 1,371,435 | 1,692,786 | 4,363,957 | 50.61 | 87,389 | 1.44% |
| 361.0 | Structures & Improvements | 4,510,462 | 1.25 | 5,638,078 | 650,345 | 540,949 | 5,097,129 | 58.94 | 88,480 | 1.96% |
| 362.0 | Station Equipment | 96,403,578 | 1.12 | 107,972,007 | 15,863,769 | 10,609,243 | 97,362,764 | 40.16 | 2,469,505 | 2.56% |
| 363.0 | Storage Battery Equipment | 0 | 1.00 | 0 | 0 | 0 | 0 | 0.00 | 0 | 9.09% |
| 364.0 | Poles, Towers, & Fixtures | 80,503,822 | 1.87 | 150,542,147 | 32,451,643 | 43,312,615 | 107,229,532 | 33.33 | 3,443,113 | 4.28% |
| 365.0 | Overhead Conductor & Devices | 139,323,640 | 1.16 | 161,615,422 | 24,893,815 | 30,202,531 | 131,412,891 | 32.63 | 3,981,515 | 2.86% |
| 366.0 | Underground Conduit | 12,573,950 | 1.00 | 12,573,950 | 2,780,271 | 2,977,885 | 9,596,065 | 50.84 | 208,457 | 1.66% |
| 367.0 | Underground Conductor | 37,852,912 | 1.00 | 37,852,912 | 14,814,525 | 13,307,161 | 24,545,751 | 42.40 | 741,401 | 1.96% |
| 368.0 | Line Transformers | 52,380,639 | 1.08 | 56,571,090 | 16,556,427 | 22,569,130 | 34,001,960 | 19.24 | 1,791,873 | 3.42% |
| 369.0 | Services | 33,052,679 | 1.24 | 40,985,322 | 11,709,296 | 14,282,261 | 26,703,061 | 33.12 | 875,696 | 2.65% |
| 370.0 | Meters | 22,239,359 | 1.20 | 26,687,231 | 5,776,094 | 5,776,094 | 20,911,137 | **(3)** | 2,241,727 | 10.08% |
| 371.0 | Installations on Custs. Prem. | 8,344,653 | 1.23 | 10,263,923 | 3,593,958 | 6,412,292 | 3,851,631 | 11.64 | 408,541 | 4.90% |
| 373.0 | Street Lighting & Signal Sys. | 5,882,009 | 1.18 | 6,940,771 | 1,682,554 | 2,149,078 | 4,791,693 | 13.12 | 220,811 | 3.75% |
| **Total Distribution Plant - MI** | | **499,124,446** | **1.25** | **623,699,596** | **132,144,132** | **153,832,025** | **469,867,571** | **28.38** | **16,558,508** | **3.32%** |
| **Total Distribution Plant** | | **2,580,186,180** | **1.21** | **3,130,477,442** | **628,846,819** | **728,795,524** | **2,401,681,918** | **29.33** | **81,896,932** | **3.17%** |
| **GENERAL PLANT** | | | | | | | | | | |
| 390.0 | Structures & Improvements | 61,646,560 | 1.05 | 64,728,888 | 13,985,046 | 9,451,468 | 55,277,420 | 35.28 | 1,566,820 | 2.54% |
| 391.0 | Office Furniture & Equipment | 5,869,860 | 0.97 | 5,693,764 | 2,427,416 | 1,640,513 | 4,053,251 | 12.62 | 321,177 | 5.47% |
| 393.0 | Stores Equipment | 996,539 | 1.00 | 996,539 | 285,967 | 193,264 | 803,275 | 9.98 | 80,488 | 8.08% |
| 394.0 | Tools Shop & Garage Equipment | 16,780,302 | 1.00 | 16,780,302 | 7,424,999 | 5,018,013 | 11,762,289 | 8.92 | 1,318,642 | 7.86% |
| 395.0 | Laboratory Equipment | 240,988 | 0.99 | 238,578 | 114,920 | 77,666 | 160,912 | 10.37 | 15,517 | 6.44% |
| 396.0 | Power Operated Equipment | 543,715 | 1.00 | 543,715 | 355,674 | 240,374 | 303,341 | 8.65 | 35,068 | 6.45% |
| 397.0 | Communication Equipment | 66,159,303 | 1.01 | 66,820,896 | 18,584,595 | 12,559,966 | 54,260,930 | 19.49 | 2,784,040 | 4.21% |
| 398.0 | Miscellaneous Equipment | 10,826,054 | 0.92 | 9,959,970 | 4,036,340 | 2,727,867 | 7,232,103 | 17.84 | 405,387 | 3.74% |
| **Total General Plant** | | **163,063,321** | **1.02** | **165,762,652** | **47,214,957** | **31,909,131** | **133,853,521** | **20.51** | **6,527,140** | **4.00%** |
| | **Total Depreciable Plant** | **9,136,620,707** | **1.12** | **10,217,868,080** | **4,344,050,074** | **3,450,907,913** | **6,766,960,163** | **17.10** | **395,620,544** | **4.33%** |

**Notes:**

(1) Production Plant original cost includes 2021-22 forecasted plant additions totaling $269,468,143. A corresponding adjustment was made to Production Plant accumulated depreciation that includes an additional two years of depreciation using the expected plant balances at 12/31/2022.

(2) Rockport depreciation rates are calculated using a 2028 retirement date.

(3) The depreciation rate for Distribution Account 370, Meters, was calculated to include AMI Meter deployment set to begin in 2021 along with the expected retirement of the current meters. The depreciation rate that was calculated is based on a 15 year service life of the AMI Meters to be installed.

**INDIANA MICHIGAN POWER COMPANY**
**ANNUAL DEPRECIATION RATES AND ACCRUALS BY THE REMAINING LIFE METHOD**
**SCHEDULE II - COMPARE DEPRECIATION EXPENSE USING CURRENT AND STUDY RATES**
**BASED ON DEPRECIABLE PLANT IN SERVICE AT DECEMBER 31, 2020 (1)**

IN

| ACCOUNT NO. | TITLE | ORIGINAL COST | CURRENT INDIANA APPROVED RATE | ANNUAL ACCRUAL | STUDY RATE | STUDY ACCRUAL | DIFFERENCE (DECREASE) |
|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| **STEAM PRODUCTION PLANT** | | | | | | | |
| **Rockport** | | | | | | | |
| 311.0 | Structures & Improvements | 103,081,792 | 6.96% | 7,174,493 | 9.19% | 9,470,443 | 2,295,950 |
| 312.0 | Boiler Plant Equipment | 646,499,630 | 7.22% | 46,677,273 | 9.90% | 63,995,026 | 17,317,753 |
| 314.0 | Turbogenerator Units | 110,198,824 | 7.58% | 8,353,071 | 9.82% | 10,824,210 | 2,471,139 |
| 315.0 | Accessory Electrical Equipment | 60,038,956 | 6.92% | 4,154,696 | 9.10% | 5,465,835 | 1,311,139 |
| 316.0 | Miscellaneous Power Plant Equipment | 17,952,020 | 7.40% | 1,328,449 | 9.67% | 1,736,276 | 407,827 |
| | Total Rockport | 937,771,222 | 7.22% | 67,687,982 | 9.76% | 91,491,790 | 23,803,808 |
| **Total Steam Production Plant** | | **937,771,222** | **7.22%** | **67,687,982** | **9.76%** | **91,491,790** | **23,803,808** |
| **NUCLEAR PRODUCTION PLANT** | | | | | | | |
| **Cook Unit 1** | | | | | | | |
| 321.0 | Structures & Improvements | 86,734,372 | 3.34% | 2,896,928 | 3.60% | 3,125,355 | 228,427 |
| 322.0 | Reactor Plant Equipment | 782,729,686 | 4.35% | 34,048,741 | 4.87% | 38,123,223 | 4,074,482 |
| 323.0 | Turbogenerator Units | 312,897,355 | 5.16% | 16,145,504 | 5.43% | 17,003,166 | 857,662 |
| 324.0 | Accessory Electrical Equipment | 137,248,173 | 3.92% | 5,380,128 | 4.35% | 5,970,618 | 590,490 |
| 325.0 | Miscellaneous Power Plant Equipment | 36,218,603 | 4.55% | 1,647,946 | 4.71% | 1,705,971 | 58,025 |
| | Total Cook Unit 1 | 1,355,828,189 | 4.43% | 60,119,247 | 4.86% | 65,928,332 | 5,809,085 |
| **Cook Unit 2** | | | | | | | |
| 321.0 | Structures & Improvements | 378,680,285 | 3.28% | 12,420,713 | 3.61% | 13,687,067 | 1,266,354 |
| 322.0 | Reactor Plant Equipment | 1,053,868,998 | 3.82% | 40,257,796 | 4.33% | 45,620,447 | 5,362,651 |
| 323.0 | Turbogenerator Units | 425,843,325 | 4.81% | 20,483,064 | 5.06% | 21,530,145 | 1,047,081 |
| 324.0 | Accessory Electrical Equipment | 200,678,427 | 3.69% | 7,405,034 | 4.23% | 8,493,418 | 1,088,384 |
| 325.0 | Miscellaneous Power Plant Equipment | 248,016,731 | 3.86% | 9,573,446 | 4.19% | 10,386,037 | 812,591 |
| | Total Cook Unit 2 | 2,307,087,766 | 3.91% | 90,140,053 | 4.32% | 99,717,114 | 9,577,061 |
| **Total Nuclear Production Plant** | | **3,662,915,955** | **4.10%** | **150,259,300** | **4.52%** | **165,645,446** | **15,386,146** |
| **HYDRAULIC PRODUCTION PLANT** | | | | | | | |
| **Berrien Springs** | | | | | | | |
| 331.0 | Structures & Improvements | 696,548 | 3.12% | 21,732 | 4.12% | 28,688 | 6,956 |
| 332.0 | Reservoirs, Dams & Waterways | 6,320,266 | 2.34% | 147,894 | 3.52% | 222,196 | 74,302 |
| 333.0 | Waterwheels, Turbines & Generators | 8,386,954 | 2.82% | 236,512 | 3.88% | 325,533 | 89,021 |
| 334.0 | Accessory Electrical Equip. | 1,417,718 | 2.59% | 36,719 | 3.75% | 53,207 | 16,488 |
| 335.0 | Misc. Power Plant Equip. | 929,404 | 3.06% | 28,440 | 4.06% | 37,777 | 9,337 |
| | Total Berrien Springs | 17,750,890 | 2.66% | 471,297 | 3.76% | 667,402 | 196,105 |
| **Buchanan** | | | | | | | |
| 331.0 | Structures & Improvements | 660,195 | 3.23% | 21,324 | 4.15% | 27,377 | 6,053 |
| 332.0 | Reservoirs, Dams & Waterways | 5,154,683 | 2.29% | 118,042 | 3.36% | 173,440 | 55,398 |
| 333.0 | Waterwheels, Turbines & Generators | 1,414,445 | 2.19% | 30,976 | 3.30% | 46,670 | 15,694 |
| 334.0 | Accessory Electrical Equip. | 1,108,771 | 2.47% | 27,387 | 3.54% | 39,231 | 11,844 |
| 335.0 | Misc. Power Plant Equip. | 311,833 | 3.22% | 10,041 | 4.15% | 12,926 | 2,885 |
| | Total Buchanan | 8,649,927 | 2.40% | 207,770 | 3.46% | 299,643 | 91,873 |

**INDIANA MICHIGAN POWER COMPANY**
**ANNUAL DEPRECIATION RATES AND ACCRUALS BY THE REMAINING LIFE METHOD**
**SCHEDULE II - COMPARE DEPRECIATION EXPENSE USING CURRENT AND STUDY RATES**
**BASED ON DEPRECIABLE PLANT IN SERVICE AT DECEMBER 31, 2020 (1)**

IN

| ACCOUNT NO. | TITLE | ORIGINAL COST | CURRENT INDIANA APPROVED RATE | ANNUAL ACCRUAL | STUDY RATE | STUDY ACCRUAL | DIFFERENCE (DECREASE) |
|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| **Elkhart** | | | | | | | |
| 331.0 | Structures & Improvements | 1,632,902 | 3.14% | 51,273 | 6.00% | 97,918 | 46,645 |
| 332.0 | Reservoirs, Dams & Waterways | 11,027,557 | 3.64% | 401,403 | 6.49% | 715,350 | 313,947 |
| 333.0 | Waterwheels, Turbines & Generators | 875,459 | 2.40% | 21,011 | 5.24% | 45,896 | 24,885 |
| 334.0 | Accessory Electrical Equip. | 766,670 | 2.37% | 18,170 | 5.36% | 41,108 | 22,938 |
| 335.0 | Misc. Power Plant Equip. | 342,337 | 4.48% | 15,337 | 7.30% | 24,999 | 9,662 |
| | Total Elkhart | 14,644,925 | 3.46% | 507,194 | 6.32% | 925,270 | 418,076 |
| **Twin Branch** | | | | | | | |
| 331.0 | Structures & Improvements | 1,428,784 | 2.89% | 41,292 | 4.66% | 66,648 | 25,356 |
| 332.0 | Reservoirs, Dams & Waterways | 8,416,861 | 2.31% | 194,429 | 3.99% | 335,807 | 141,378 |
| 333.0 | Waterwheels, Turbines & Generators | 9,909,128 | 2.59% | 256,646 | 4.27% | 423,349 | 166,703 |
| 334.0 | Accessory Electrical Equip. | 2,876,083 | 2.44% | 70,176 | 4.21% | 121,131 | 50,955 |
| 335.0 | Misc. Power Plant Equip. | 1,005,606 | 3.46% | 34,794 | 5.03% | 50,606 | 15,812 |
| | Total Twin Branch | 23,636,462 | 2.53% | 597,337 | 4.22% | 997,541 | 400,204 |
| **Constantine** | | | | | | | |
| 331.0 | Structures & Improvements | 470,900 | 2.36% | 11,113 | 2.54% | 11,958 | 845 |
| 332.0 | Reservoirs, Dams & Waterways | 1,653,789 | 2.26% | 37,376 | 2.44% | 40,330 | 2,954 |
| 333.0 | Waterwheels, Turbines & Generators | 993,032 | 2.20% | 21,847 | 2.40% | 23,832 | 1,985 |
| 334.0 | Accessory Electrical Equip. | 671,796 | 2.82% | 18,945 | 3.05% | 20,511 | 1,566 |
| 335.0 | Misc. Power Plant Equip. | 475,641 | 2.99% | 14,222 | 3.08% | 14,650 | 428 |
| | Total Constantine | 4,265,158 | 2.43% | 103,503 | 2.61% | 111,281 | 7,778 |
| **Mottville** | | | | | | | |
| 331.0 | Structures & Improvements | 797,060 | 3.38% | 26,941 | 4.64% | 37,012 | 10,071 |
| 332.0 | Reservoirs, Dams & Waterways | 2,312,828 | 2.72% | 62,909 | 4.08% | 94,320 | 31,411 |
| 333.0 | Waterwheels, Turbines & Generators | 639,576 | 2.45% | 15,670 | 3.87% | 24,747 | 9,077 |
| 334.0 | Accessory Electrical Equip. | 772,571 | 3.21% | 24,800 | 4.56% | 35,218 | 10,418 |
| 335.0 | Misc. Power Plant Equip. | 409,136 | 4.32% | 17,675 | 5.45% | 22,293 | 4,618 |
| 336.0 | Roads, Railroads & Bridges | 902 | 1.62% | 15 | 3.15% | 28 | 13 |
| | Total Mottville | 4,932,073 | 3.00% | 148,010 | 4.33% | 213,618 | 65,608 |
| **Crew Service Center** | | | | | | | |
| 331.0 | Structures & Improvements | 417,303 | 1.24% | 5,175 | 1.64% | 6,829 | 1,654 |
| 335.0 | Misc. Power Plant Equip. | 126,865 | 1.22% | 1,548 | 1.62% | 2,059 | 511 |
| | Total Crew Service Center | 544,168 | 1.24% | 6,723 | 1.63% | 8,888 | 2,165 |
| **Total Hydraulic Production Plant** | | **74,423,603** | **2.74%** | **2,041,834** | **4.33%** | **3,223,644** | **1,181,810** |

**INDIANA MICHIGAN POWER COMPANY**
**ANNUAL DEPRECIATION RATES AND ACCRUALS BY THE REMAINING LIFE METHOD**
**SCHEDULE II - COMPARE DEPRECIATION EXPENSE USING CURRENT AND STUDY RATES**
**BASED ON DEPRECIABLE PLANT IN SERVICE AT DECEMBER 31, 2020 (1)**

IN

| ACCOUNT NO. | TITLE | ORIGINAL COST | CURRENT INDIANA APPROVED RATE | ANNUAL ACCRUAL | STUDY RATE | STUDY ACCRUAL | DIFFERENCE (DECREASE) |
|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| **OTHER PRODUCTION PLANT** | | | | | | | |
| **Deer Creek Solar Facility** | | | | | | | |
| 344.0 | Generators | 5,668,204 | 5.29% | 299,848 | 5.38% | 304,821 | 4,973 |
| 345.0 | Accessory Electric Equip. | 720,502 | 5.35% | 38,547 | 6.57% | 47,342 | 8,795 |
| 346.0 | Misc. Power Plant Equip. | 10,893 | 6.12% | 667 | 7.11% | 775 | 108 |
| | Total Deer Creek Solar Facility | 6,399,599 | 5.30% | 339,062 | 5.51% | 352,938 | 13,876 |
| **Olive Solar Facility** | | | | | | | |
| 341.0 | Structures & Improvements | 376,687 | 5.31% | 20,002 | 5.33% | 20,088 | 86 |
| 344.0 | Generators | 11,184,837 | 5.31% | 593,915 | 5.33% | 596,459 | 2,544 |
| 345.0 | Accessory Electric Equip. | 269,062 | 5.31% | 14,287 | 5.33% | 14,348 | 61 |
| 346.0 | Misc. Power Plant Equip. | 215,250 | 5.31% | 11,430 | 5.33% | 11,479 | 49 |
| | Total Olive Solar Facility | 12,045,836 | 5.31% | 639,634 | 5.33% | 642,374 | 2,740 |
| **Twin Branch Solar Facility** | | | | | | | |
| 344.0 | Generators | 6,955,324 | 5.31% | 369,328 | 5.38% | 374,511 | 5,183 |
| **Watervliet Facility** | | | | | | | |
| 341.0 | Structures & Improvements | 358,237 | 5.25% | 18,807 | 5.33% | 19,104 | 297 |
| 344.0 | Generators | 11,107,366 | 5.25% | 583,137 | 5.33% | 592,328 | 9,191 |
| 346.0 | Misc. Power Plant Equip. | 343,931 | 5.26% | 18,091 | 5.34% | 18,358 | 267 |
| | Total Watervliet Facility | 11,809,534 | 5.25% | 620,035 | 5.33% | 629,789 | 9,754 |
| **Total Other Production Plant** | | **37,210,293** | **5.29%** | **1,968,059** | **5.37%** | **1,999,612** | **31,553** |
| **Total Production Plant** | | **4,712,321,073** | **4.71%** | **221,957,175** | **5.57%** | **262,360,492** | **40,403,317** |
| **TRANSMISSION PLANT** | | | | | | | |
| 350.1 | Land Rights | 62,292,873 | 1.66% | 1,034,062 | 1.76% | 1,094,690 | 60,628 |
| 352.0 | Structures & Improvements | 52,265,232 | 1.77% | 925,095 | 1.76% | 917,627 | (7,468) |
| 353.0 | Station Equipment | 826,489,176 | 2.43% | 20,083,687 | 2.68% | 22,167,670 | 2,083,983 |
| 354.0 | Towers & Fixtures | 230,452,983 | 2.57% | 5,922,642 | 2.85% | 6,559,865 | 637,223 |
| 355.0 | Poles & Fixtures | 208,136,265 | 3.19% | 6,639,547 | 3.40% | 7,070,149 | 430,602 |
| 356.0 | OH Conductor & Devices | 294,558,395 | 2.35% | 6,922,122 | 2.34% | 6,880,786 | (41,336) |
| 357.0 | Underground Conduit | 2,241,687 | 2.30% | 51,559 | 2.25% | 50,369 | (1,190) |
| 358.0 | Underground Conductor | 4,522,363 | 1.93% | 87,282 | 2.06% | 93,289 | 6,007 |
| 359.0 | Roads and Trails | 91,159 | 1.61% | 1,468 | 1.68% | 1,535 | 67 |
| **Total Transmission Plant** | | **1,681,050,133** | **2.48%** | **41,667,464** | **2.67%** | **44,835,980** | **3,168,516** |

**INDIANA MICHIGAN POWER COMPANY**
**ANNUAL DEPRECIATION RATES AND ACCRUALS BY THE REMAINING LIFE METHOD**
**SCHEDULE II - COMPARE DEPRECIATION EXPENSE USING CURRENT AND STUDY RATES**
**BASED ON DEPRECIABLE PLANT IN SERVICE AT DECEMBER 31, 2020 (1)**

IN

| ACCOUNT NO. | TITLE | ORIGINAL COST | CURRENT INDIANA APPROVED RATE | ANNUAL ACCRUAL | STUDY RATE | STUDY ACCRUAL | DIFFERENCE (DECREASE) |
|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| **DISTRIBUTION PLANT - IN** | | | | | | | |
| 360.1 | Land Rights | 10,926,039 | 1.42% | 155,150 | 1.44% | 157,646 | 2,496 |
| 361.0 | Structures & Improvements | 32,691,043 | 1.57% | 513,249 | 1.96% | 641,289 | 128,040 |
| 362.0 | Station Equipment | 379,401,090 | 2.17% | 8,233,004 | 2.56% | 9,718,860 | 1,485,856 |
| 363.0 | Storage Battery Equipment | 5,606,730 | 8.33% | 467,041 | 9.09% | 509,494 | 42,453 |
| 364.0 | Poles, Towers, & Fixtures | 252,111,755 | 4.95% | 12,479,532 | 4.28% | 10,782,708 | (1,696,824) |
| 365.0 | Overhead Conductor & Devices | 399,931,378 | 3.11% | 12,437,866 | 2.86% | 11,429,020 | (1,008,846) |
| 366.0 | Underground Conduit | 144,882,340 | 1.79% | 2,593,394 | 1.66% | 2,401,933 | (191,461) |
| 367.0 | Underground Conductor | 255,708,978 | 1.94% | 4,960,754 | 1.96% | 5,008,409 | 47,655 |
| 368.0 | Line Transformers | 318,204,324 | 4.92% | 15,655,653 | 3.42% | 10,885,354 | (4,770,299) |
| 369.0 | Services | 166,556,147 | 2.97% | 4,946,718 | 2.65% | 4,412,730 | (533,988) |
| 370.0 | Meters (3) | 76,493,447 | 9.27% | 7,090,943 | 10.08% | 7,710,539 | 619,596 |
| 371.0 | Installations on Custs. Prem. | 20,434,795 | 6.99% | 1,428,392 | 4.90% | 1,000,455 | (427,937) |
| 373.0 | Street Lighting & Signal Sys. | 18,113,668 | 5.05% | 914,740 | 3.75% | 679,987 | (234,753) |
| **Total Distribution Plant - IN** | | **2,081,061,734** | **3.45%** | **71,876,436** | **3.14%** | **65,338,424** | **(6,538,012)** |
| **DISTRIBUTION PLANT - MI** | | | | | | | |
| 360.1 | Land Rights | 6,056,743 | 1.42% | 86,006 | 1.44% | 87,389 | 1,383 |
| 361.0 | Structures & Improvements | 4,510,462 | 1.57% | 70,814 | 1.96% | 88,480 | 17,666 |
| 362.0 | Station Equipment | 96,403,578 | 2.17% | 2,091,958 | 2.56% | 2,469,505 | 377,547 |
| 363.0 | Storage Battery Equipment | 0 | 8.33% | 0 | 9.09% | 0 | 0 |
| 364.0 | Poles, Towers, & Fixtures | 80,503,822 | 4.95% | 3,984,939 | 4.28% | 3,443,113 | (541,826) |
| 365.0 | Overhead Conductor & Devices | 139,323,640 | 3.11% | 4,332,965 | 2.86% | 3,981,515 | (351,450) |
| 366.0 | Underground Conduit | 12,573,950 | 1.79% | 225,074 | 1.66% | 208,457 | (16,617) |
| 367.0 | Underground Conductor | 37,852,912 | 1.94% | 734,346 | 1.96% | 741,401 | 7,055 |
| 368.0 | Line Transformers | 52,380,639 | 4.92% | 2,577,127 | 3.42% | 1,791,873 | (785,254) |
| 369.0 | Services | 33,052,679 | 2.97% | 981,665 | 2.65% | 875,696 | (105,969) |
| 370.0 | Meters | 22,239,359 | 9.27% | 2,061,589 | 10.08% | 2,241,727 | 180,138 |
| 371.0 | Installations on Custs. Prem. | 8,344,653 | 6.99% | 583,291 | 4.90% | 408,541 | (174,750) |
| 373.0 | Street Lighting & Signal Sys. | 5,882,009 | 5.05% | 297,041 | 3.75% | 220,811 | (76,230) |
| **Total Distribution Plant - MI** | | **499,124,446** | **3.61%** | **18,026,815** | **3.32%** | **16,558,508** | **(1,468,307)** |
| **Total Distribution Plant** | | **2,580,186,180** | **3.48%** | **89,903,251** | **3.17%** | **81,896,932** | **(8,006,319)** |
| **GENERAL PLANT** | | | | | | | |
| 390.0 | Structures & Improvements | 61,646,560 | 2.08% | 1,282,248 | 2.54% | 1,566,820 | 284,572 |
| 391.0 | Office Furniture & Equipment | 5,869,860 | 4.79% | 281,166 | 5.47% | 321,177 | 40,011 |
| 393.0 | Stores Equipment | 996,539 | 7.35% | 73,246 | 8.08% | 80,488 | 7,242 |
| 394.0 | Tools Shop & Garage Equipment | 16,780,302 | 6.99% | 1,172,943 | 7.86% | 1,318,642 | 145,699 |
| 395.0 | Laboratory Equipment | 240,988 | 5.41% | 13,037 | 6.44% | 15,517 | 2,480 |
| 396.0 | Power Operated Equipment | 543,715 | 4.81% | 26,153 | 6.45% | 35,068 | 8,915 |
| 397.0 | Communication Equipment | 66,159,303 | 3.91% | 2,586,829 | 4.21% | 2,784,040 | 197,211 |
| 398.0 | Miscellaneous Equipment | 10,826,054 | 3.32% | 359,425 | 3.74% | 405,387 | 45,962 |
| **Total General Plant** | | **163,063,321** | **3.55%** | **5,795,047** | **4.00%** | **6,527,140** | **732,093** |
| | **Total Depreciable Plant** | **9,136,620,707** | **3.93%** | **359,322,937** | **4.33%** | **395,620,544** | **36,297,607** |

**Notes:**

(1) Production Plant original cost includes 2021-22 forecasted plant additions totaling $269,468,143. A corresponding adjustment was made to Production Plant accumulated depreciation that includes an additional two years of depreciation using the expected plant balances at 12/31/2022.

(2) Rockport depreciation rates are calculated using a 2028 retirement date.

(3) The depreciation rate for Distribution Account 370, Meters, was calculated to include AMI Meter deployment set to begin in 2021 along with the expected retirement of the current meters. The depreciation rate that was calculated is based on a 15 year service life of the AMI Meters to be installed.

**INDIANA MICHIGAN POWER COMPANY**
**SCHEDULE III - COMPARISON OF MORTALITY CHARACTERISTICS**
**DEPRECIATION STUDY AS OF DECEMBER 31, 2020**

| (1) | | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Existing Rates | | | | | Study Rates | | | | |
| | | Average Service Life (Years) | Iowa Curve | Salvage Factor | Cost of Removal Factor | Net Salvage Factor | Average Service Life (Years) | Iowa Curve | Salvage Factor | Cost of Removal Factor | Net Salvage Factor |
| **TRANSMISSION PLANT** | | | | | | | | | | | |
| 350.1 | Rights of Way | 65 | R5.0 | 0% | 0% | 0% | 65 | R5.0 | 0% | 0% | 0% |
| 352.0 | Structures & Improvements | 70 | L2.0 | 0% | 18% | -18% | 65 | L1.5 | 0% | 10% | -10% |
| 353.0 | Station Equipment | 45 | L1.0 | 16% | 21% | -5% | 44 | L1.0 | 15% | 25% | -10% |
| 354.0 | Towers & Fixtures | 64 | R5.0 | 4% | 41% | -37% | 66 | R5.0 | 2% | 41% | -39% |
| 355.0 | Poles & Fixtures | 51 | L0.5 | 5% | 64% | -59% | 50 | L0.5 | 3% | 67% | -64% |
| 356.0 | OH Cond. & Devices | 66 | R4.0 | 13% | 53% | -40% | 67 | R4.0 | 8% | 43% | -35% |
| 357.0 | Underground Conduit | 50 | L5.0 | 0% | 0% | 0% | 55 | R5.0 | 0% | 0% | 0% |
| 358.0 | Underground Conductor and Devices | 65 | L2.5 | 1% | 19% | -18% | 60 | L1.5 | 0% | 13% | -13% |
| 359.0 | Roads and Trails | 65 | R5.0 | 0% | 0% | 0% | 65 | R5.0 | 0% | 0% | 0% |
| **DISTRIBUTION PLANT** | | | | | | | | | | | |
| 360.1 | Rights of Way | 65 | R5.0 | 0% | 0% | 0% | 65 | R5.0 | 0% | 0% | 0% |
| 361.0 | Structures & Improvements | 71 | R2.0 | 2% | 14% | -12% | 65 | R1.5 | 1% | 26% | -25% |
| 362.0 | Station Equipment | 49 | L0.0 | 13% | 19% | -6% | 46 | L0.5 | 10% | 22% | -12% |
| 363.0 | Storage Battery Equipment | 15 | SQ | 0% | 0% | 0% | 15 | SQ | 0% | 0% | 0% |
| 364.0 | Poles, Towers, & Fixtures | 35 | L0.0 | 19% | 100% | -81% | 41 | L0.0 | 17% | 104% | -87% |
| 365.0 | Overhead Conductor & Devices | 35 | L0.0 | 20% | 33% | -13% | 39 | L0.0 | 18% | 34% | -16% |
| 366.0 | Underground Conduit | 56 | R2.0 | 0% | 0% | 0% | 60 | R2.0 | 0% | 0% | 0% |
| 367.0 | Underground Conductor | 52 | R1.0 | 0% | 0% | 0% | 54 | R2.0 | 0% | 0% | 0% |
| 368.0 | Line Transformers | 21 | R0.5 | 18% | 24% | -6% | 27 | R0.5 | 16% | 24% | -8% |
| 369.0 | Services | 40 | R0.5 | 4% | 26% | -22% | 44 | R0.5 | 4% | 28% | -24% |
| 370.0 | Meters | 15 | SQ | 10% | 32% | -22% | 15 | SQ | 9% | 29% | -20% |
| 371.0 | Installations on Custs. Prem. | 14 | L0.0 | 3% | 26% | -23% | 17 | L0.0 | 3% | 26% | -23% |
| 373.0 | Street Lighting & Signal Sys. | 19 | R0.5 | 8% | 22% | -14% | 22 | R0.5 | 6% | 24% | -18% |
| **GENERAL PLANT** | | | | | | | | | | | |
| 390.0 | Structures & Improvements | 51 | L0.5 | 11% | 13% | -2% | 45 | L1.0 | 6% | 11% | -5% |
| 391.0 | Office Furniture & Equipment | 22 | SQ | 7% | 3% | 4% | 22 | SQ | 6% | 3% | 3% |
| 393.0 | Stores Equipment | 14 | SQ | 0% | 0% | 0% | 14 | SQ | 0% | 0% | 0% |
| 394.0 | Tools Shop & Garage Equipment | 16 | SQ | 1% | 1% | 0% | 16 | SQ | 1% | 1% | 0% |
| 395.0 | Laboratory Equipment | 20 | SQ | 2% | 1% | 1% | 20 | SQ | 2% | 1% | 1% |
| 396.0 | Power Operated Equipment | 25 | SQ | 2% | 2% | 0% | 25 | SQ | 2% | 2% | 0% |
| 397.0 | Communication Equipment | 27 | SQ | 6% | 6% | 0% | 27 | SQ | 6% | 7% | -1% |
| 398.0 | Miscellaneous Equipment | 30 | SQ | 25% | 17% | 8% | 30 | SQ | 25% | 17% | 8% |

**INDIANA MICHIGAN POWER COMPANY**
**SCHEDULE IV - ESTIMATED GENERATION PLANT RETIREMENT DATES**
**DEPRECIATION STUDY AS OF DECEMBER 31, 2020**

| Plant | Capacity (MW) | Fuel | Year Installed | Estimated Year Retired | Life Span (Years) |
|---|---|---|---|---|---|
| ***Steam Production Plant*** | | | | | |
| ***Rockport*** | | | | | |
| Unit 1 | 1,300 | Coal | 1984 | 2028 | 44 |
| Unit 2 - leased unit (a) | 1,300 | Coal | 1989 | 2028 | 39 |
| ***Nuclear Production Plant*** | | | | | |
| ***Cook*** | | | | | |
| Unit 1 | 1,020 | Nuclear | 1975 | 2034 | 59 |
| Unit 2 | 1,090 | Nuclear | 1978 | 2037 | 59 |
| ***Hydraulic Production Plant (b)*** | | | | | |
| ***Berrien Springs*** | 7.2 | Hydro | 1908 | 2036 | 128 |
| ***Buchanan*** | 4.1 | Hydro | 1919 | 2036 | 117 |
| ***Constantine*** | 1.2 | Hydro | 1921 | 2053 | 132 |
| ***Elkhart*** | 3.4 | Hydro | 1913 | 2030 | 117 |
| ***Mottville*** | 1.7 | Hydro | 1923 | 2033 | 110 |
| ***Twin Branch*** | 4.8 | Hydro | 1904 | 2036 | 132 |
| ***Other Production Plant*** | | | | | |
| ***Deer Creek Solar Facility*** | 2.5 | Solar | 2015 | 2035 | 20 |
| ***Olive Solar Facility*** | 5.0 | Solar | 2016 | 2036 | 20 |
| ***Twin Branch Solar Facility*** | 2.6 | Solar | 2016 | 2036 | 20 |
| ***Watervliet Solar Facility*** | 4.6 | Solar | 2016 | 2036 | 20 |

**NOTES:**

(a) Although the Rockport Unit 2 lease is set to expire at the end of 2022, the life span for the associated owned equipment at Rockport Unit 2 is based on a 2028 retirement date.

(b) The estimated retirement year for the Company's Hydraulic Production Plants assumes that the plants will be retired at their end of their current FERC license year except for Constantine Plant where the Company is in the process of filing for a 30 year license extension. Berrien Springs is not FERC licensed and the Berrien Springs retirement year was assumed to be the same year as Buchanan and Twin Branch Plants which is 2036.

Brandenburg®


# Rockport Power Plant

Rockport, IN

September 27, 2018

## Conceptual Dismantlement Cost

**American Electric Power Company**
**Rockport Plant**
**ROCKPORT, IN**

**Dismantling Information** **September 27, 2018**

# ROCKPORT AEP POWER PLANT
# CONCEPTUAL DEMOLITION PLAN

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DEFINITIONS:

**Concrete Debris**

Concrete stacks, cooling towers, turbine pedestals, and elevated floor slabs (estimated 66,200 cubic yards)

**Construction / Demolition Debris**

Any solid waste resulting from the construction, remodeling, repair, or demolition of structures. Such wastes may include, but not limited to;
roof material/drywall/ceiling tiles/fiberglass (estimated 16,342 yards)

**Contractor**

The individual, partnership or corporation with which AEP Company enters into a contract to perform all of the work described in the Specification.

**Contract**

A purchase order placed by Purchaser and accepted by Contractor, together with this Specification and all other documents referred to in such purchase order, or a formal contract executed by Purchaser and Contractor, together with this Specification and all other documents referred to in such formal contract.

**Engineer**

The Engineer or his authorized representative designated by AEP Company to be assigned to this contract.

**Fill Material**

Material to be used to bring area to grade.

**Greases**

Any used or unused greases or waste containing grease.

**Hazardous Waste**

Hazardous waste as defined in 40 CFR 261.3 or as defined in any applicable state regulation.

**HAZMATs**

Any hazardous, toxic or regulated substance controlled under RCRA, CERCLA or any other Federal, State, or Local law, statute, regulation or ordinance pertaining to the handling, transportation, or disposal of any controlled substance.

**SDS**

Safety Data Sheet.

**Non-Ferrous Scrap (estimated 1,836,829 lbs)**
All non-ferrous scrap such as copper or brass

**Oils (estimated 15,000 gallons)**
Any used or unused hydraulic, lubrication, rolling, waste or other such oil or oily waste.

**OSHA**
Occupational Safety and Health Act and amendments thereto.

**PCBs**
Polychlorinated By-phenols (plant personnel verified that there are no PCB's present at the site).

**Process Materials**
Any raw materials, blended raw materials, recyclable process generated dusts (such as flue dust), fly ash, ash slurry and etc.

**SCR Unit**
Selective Catalytic Reduction Unit

**Scrap Ferrous (estimated 132,374 tons)**
All ferrous scrap designated by the Engineer to be suitable for melting at a steel processing plant.

**Structural Removal**
As in the Specification, shall mean all work of every nature described herein, implied herein, or necessary to complete the work described or implied herein, with the exception of Asbestos Abatement.

**AEP Company**
American Electric Power Company

**American Electric Power Company**
**Rockport Plant**
**ROCKPORT, IN**

**Information Sheets**

**Dismantling Information** **September 27, 2018**

**ROCKPORT PLANT**

1. GENERAL SCOPE OF WORK

1.1. The work to be performed under the terms of this specification shall consist of the dismantling and removal of all facilities, machinery, equipment, all associated structures, foundations, debris, asbestos containing materials, hazardous substances and hazardous waste as directed by the Engineer. Upon completion each dismantling site shall be left in a neat, clean, safe condition.

1.2. Work under this specification shall be performed in accordance with the terms and conditions of the Contract, entered into between AEP Company and the Contractor, and in accordance with all EPA, OSHA, Federal, State, County, and Local laws, statutes, ordinances, and regulations.

1.3. The Contractor shall perform all utility disconnection and/or relocation work which is necessary to complete the proposed dismantling and removal work, without disrupting active utilities.

1.4. The Contractor shall perform all excavation, back-filling, construction and closure work which is necessary to complete the proposed dismantling work.

1.5. The Contractor shall provide all labor, materials, equipment, services and pay all necessary taxes, in addition to securing all required permits, to perform the dismantling.

1.6. The Contractor is responsible to clean up and dispose of any and all materials which are generated as a result of a spill caused by the Contractor, or which are generated as a result of the improper handling of any materials by the Contractor. This includes all RACM, Hazardous Substances, Hazardous Waste, Special wastes, Non-process Debris, Demolition Debris, and combustible materials.

1.7. The switchyard(s) shall remain intact following the razing efforts.

2. FACILITY DISMANTLEMENT AND RELATED WORK

2.1. Perform the environment abatement of the following:

2.1.1. Vacuum, transport and dispose of dust accumulations inside area of Unit 1 and 2 Boiler

2.1.2. HAZMAT sweep of structures, tanks and pipe in Unit 1 and 2 Boiler area

2.1.3. Remove Units 1 and 2 fluorescent light bulbs, PCB ballast, mercury vapor light, HID vapor lights and mercury containing instruments.

2.1.4. Remove office, storage and maintenance building fluorescent light bulbs, PCB ballast, mercury vapor light, HID vapor lights and mercury containing instruments.

2.2. Perform the building dismantling, equipment removal, concrete removal to surrounding grade elevation of the following.

2.2.1. Unit 1 boiler building, turbine generator building, precipitators, SCR unit, office and maintenance building, coal conveyor.

2.2.2. Unit 2 boiler building, turbine generator building, precipitators, office and maintenance building, coal conveyor.

2.2.3. Concrete stack for Unit 1 and 2

2.2.4. Unit 1 water-cooling tower structure, adjacent pump structures, adjacent condensate water tank to surround grade elevation. Fill the pits and trenches to surround grade elevation.

2.2.5. Unit 2 water-cooling tower structure, adjacent pump structures, adjacent condensate water tank to surround grade elevation. Fill the pits and trenches to surround grade elevation.

2.2.6. The ammonia storage building and chemical manufacturing building structure and ammonia storage tank structures.

2.2.7. The multiple single story maintenance, storage and office buildings located throughout the site.

2.2.8. The condensate storage tanks

2.2.9. Pre-Treatment Building

2.2.10. Service Building

2.2.11. Fly Ash Silos

2.2.12. The coal barge unloading station(s), the coal crusher house, car dumper building, coal conveyors, and coal transfer stations.

2.2.13. Brandenburg shall remove the existing site asphalt and concrete parking lots, roadways, and sidewalks.

2.2.14. The concrete dock river cells shall have the sheet piling, and the concrete cap removed.

2.2.15. The Clearwater Pond filled in with existing berm material and crushed concrete from the demolition efforts.

3. WORK BY CONTRACTOR

The Contractor Shall:

3.1. Furnish all supervision, labor, materials, tools, supplies and equipment necessary to perform the work, including dismantling and removal of all the facilities, equipment, structures, etc. noted herein with the exception of specific structures which are designated in this Specification to remain.

3.2. Furnish on the site, during the performance of the work, an experienced supervisor who shall be duly authorized to represent and act for the Contractor in all matters pertaining to the work covered by this Specification.

3.3. Provide all written instructions, orders, and other communications delivered to the Contractor's construction office shall be considered as having been delivered to the Contractor himself.

3.4. Develop detailed written demolition plans for each area to be dismantled, and submit them to the Engineer for his review prior to the start of work in an area. Such plans shall include, but limited to:

3.4.1. A detailed and complete schedule for the performance of the work.

3.4.2. A survey of each area, identifying all materials to be disposed of other than scrap and equipment.

3.4.3. Identification and protection of demolition areas.

3.4.4. Termination and/or relocation of utilities.

3.4.5. Handling and disposal of hazardous wastes and materials.

3.4.6. Handling and disposal of oils and greases.

3.4.7. Handling and disposal of non-hazardous debris and materials.

3.4.8. Fire prevention and protection.

3.4.9. Handling and storage locations for ferrous and non-ferrous scrap.

3.4.10. Method of demolition and/or equipment removal.

3.4.11. Clean-out, breaking open, and filling of basements, pits, and tunnels.

3.4.12. Final grading and restoration of demolition site.

3.5. Clear each site of existing equipment, structures, and material designated to be removed. Each site will be left in a neat, clean, safe condition in conformity with all applicable Federal, State, or Local laws, statutes and/or regulations, including but not limited to CAA, OSHA, RCRA, SARA, TSCA, and/or CERCLA. The finished condition of each site will be approved by the Engineer.

3.6. Remove all structures down to final grade except where otherwise noted. Final grade will generally be the adjacent grade surrounding the facility to be removed. The removal of concrete & debris and grading will be done concurrent with the demolition work. As one area is cleared of structures, the required concrete removal work in that area will be done simultaneously with the demolition of structures in the next area of work. If the Contractor breaches the provisions of this section AEP Company reserves the right, in AEP Company's sole opinion, to stop the Contractor from doing further demolition until the concrete and debris removal is current.

3.7. Perform all material removal work in accordance with all applicable Federal, State, and/or Local rules, regulations and/or ordinances, which is necessary to complete the proposed removal work.

3.8. Perform all utility, telecommunications and telemetering disconnection and/or relocation work which is necessary to complete the proposed removal work.

3.9. Prior to beginning demolition of any facility, Contractor shall ascertain that no live utilities remain in the facility and identify and locate all underground utilities. It shall be the Contractor's exclusive responsibility to determine that all utility systems in each area remain isolated from active utility systems.

3.10. Perform all excavation, back–filling, construction and closure work which is necessary to complete the proposed dismantling and removal work.

3.11. Remove all debris generated as a result of the proposed removal work.

3.12. Break the floors of all pits, trenches and depressions sufficiently to provide drainage and to prevent the accumulation of water within the underground structure.

3.13. Tunnel and basement roof structures which do not support structures designated to remain and which are located less than 3 feet below finish grade elevation will be broken in. Said tunnel excavations will be filled with fill materials approved by the Site Engineer up to finish grade elevation.

3.14. Properly drain and capture all contents of pipelines prior to dismantling any pipelines.

3.15. Empty and shovel clean all pits, sumps, basements, and depressions to the satisfaction of the Engineer.

Areas will be inspected by the Site Engineer prior to filling. Any pits, sumps, basements or depressions in contact with a hazardous waste or PCB shall be decontaminated in accordance with any applicable Federal and/or State rules and/or regulations.

3.16. Back-fill all pits, sumps, and depressions up to existing grade. Each site shall be rough graded and left in a neat, clean, safe condition. Contractor will use fill material approved by the Engineer. The final six inches of fill shall be other select fill material approved by the Engineer.

3.17. Furnish all fill material in accordance with the Specification. If the work activity generates more fill material than needed, the Contractor shall pay for the transportation and disposal off site. If the work activity is fill negative, the Contractor shall pay for the purchase and transportation of required fill to the site. Such purchased material shall be approved by the Site Engineer.

3.18. Furnish portable sanitary facilities and drinking water for Contractor's personnel in areas of removal.

3.19. Furnish electric power and temporary lighting in those areas of removal where active utilities are not available.

3.20. Provide adequate protective barriers for open pits, holes and depressions, as a result of the equipment removal work, until they are properly backfilled. Temporary barricades shall conform to all applicable Federal, State and Local, rules and regulations or standards including, but not limited to OSHA.

3.21. Remove above ground utility support systems such as poles, structural steel towers or guy wires which have been designated to be removed by the Engineer.

3.22. Remove and scrap all tanks, including supporting steel and concrete structures. Prior to removal work Contractor shall remove the contents of each tank, drain each tank and otherwise purge each tank in accordance with all applicable rules or regulations to render them safe for removal. Notify Engineer of any potentially contaminated soils. Remove of these tanks shall conform to all applicable Federal, State, and Local laws, statutes, regulations or ordinances.

3.23. Secure the approval of local Fire Department for the Fire Prevention Plan. Contractor shall meet with representatives of the Fire Department prior to commencement of work on each facility. Prior to the commencement of removal work, Contractor shall inspect all fire hydrants in the work area and shall notify the Engineer of those that are not in good operating condition.

3.24. Provide fire extinguishers and fire hoses as required to immediately control any fires resulting from the work. Implement all fire prevention measures as directed by the Fire Department. Measures required by Fire Department may include, but will not be limited to, the maintenance of pressurized fire hoses at each removal site.

3.25. Attend a safety meeting with AEP Company's representatives prior to starting work in each facility or designed area.

3.26. Furnish all temporary or permanent supports or protective devices which are necessary to preserve active pipes, electrical lines or other structures which AEP Company designates to remain in place.

3.27. Abide by AEP Company Contractor Safety Responsibilities, AEP Company Energy Control-Lockout and Tryout Rules, as well as all Federal, State, and Local regulations.

3.28. Secure the Engineer's approval prior to using any railroad track or mobile crane movements to or from the dismantling site.

3.29. Schedule rail movements, order all railroad cars and be solely responsible for demurrage charges resulting from the Contractor's operations.

3.30. Where Contractor removes railroad track, the Contractor shall remove all wooden and concrete ties, and load and transport them to an approved disposal site approved by the Engineer. Contractor shall be responsible for

the cost of all removal, loading, transportation, and disposal of such material.

3.31. Subsequent to the removal efforts, Brandenburg shall place six (6) inches of topsoil and hydro seed the work area.

3.32. HAZARDOUS WASTE HANDLING AND DISPOSAL

3.32.1. Contractor shall provide all supervision, labor, consumable materials, tools, equipment, documentation, services and permits required to identify, remove and load any hazardous waste located in, adjacent to or forming a part of the equipment designated for removal. Contractor shall be responsible to perform all in-plant handling of such materials, including, but not limited to removal, loading, and in-plant transportation. Hazardous waste removal work shall include, but is not necessarily limited to, the work described herein.

3.32.2. Contractor is required to secure samples of all materials, which are suspected of being a hazardous waste, located in the areas defined in this Specification. Samples shall be collected in accordance with all applicable regulations. Contractor shall deliver all samples of suspected hazardous waste to the Engineer. AEP Company shall secure required analyses of all such samples.

3.32.3. Prepare a complete written hazardous waste removal plan for each work site that will be submitted to the Engineer for his review prior to the start of work in an area.

3.32.4. Contractor shall provide all respirators, protective clothing and equipment required to protect all personnel associated with the handling or removal of any Hazardous Wastes. All said respirators, protective clothing and equipment shall conform to all applicable rules, regulations and standards, including but not limited to OSHA.

3.32.5. Employ only competent persons, trained, knowledgeable and qualified in the techniques of handling and disposal of hazardous wastes and subsequent cleaning of contaminated areas. Employees who perform hazardous waste removal work shall possess current, valid licenses as required by any government agency having jurisdiction over the work. Perform all hazardous waste removal in strict accordance with all applicable Federal, State and Local laws, statutes, ordinances and regulations. Contractor shall provide timely and accurate notification in accordance with all Federal, State and Local laws, statutes, regulations and ordinances.

3.32.6. Contractor shall post all appropriate warning signs at each work area, as is required by applicable regulations.

3.32.7. Maintain complete and accurate records of all removal activities in accordance with all Federal, State, and Local laws, statutes, regulations and ordinances. Contractor shall submit copies of all such records to AEP Company on a weekly basis.

3.32.8. Perform personal monitoring as necessary to assure the safety of all persons associated with the removal of hazardous wastes and as required by Federal, State, and Local laws, statutes, regulations and ordinances. If so required, Contractor shall perform environmental air monitoring in the area of each location where hazardous waste removal work is performed. Environmental air monitoring shall comply with applicable Federal, State, and Local laws, statutes, regulations and ordinances.

3.32.9. AEP Company shall be responsible for disposal, the method of disposal and the disposal site for all identified hazardous waste except asbestos waste. Contractor shall load all such wastes into trucks or containers provided by AEP Company.

3.33. CONSTRUCTION / DEMOLITION WASTE

3.33.1. Contractor is required to perform the work described herein in a manner that will separate construction / demolition waste from ferrous scrap, combustible waste, non-ferrous scrap, ferrous scrap, process demolition waste, oils and greases, hazardous wastes, and all other materials.

3.33.2. Contractor shall identify all quantities of construction / demolition waste to the Engineer. The Engineer shall positively identify all such materials as being construction / demolition waste.

3.33.3. For all materials which have been positively identified by the Engineer as construction / demolition waste, Contractor shall use such materials as clean fill in locations approved for filling by the Engineer.

3.33.4. Contractor shall be responsible to perform all in-plant handling of such materials, including, but not limited to, screening, separation, from other materials, loading, crushing and transportation.

3.33.5. Contractor shall be responsible for any costs that are incurred as a result of his handling construction / demolition waste, including, but not limited to, sampling, analysis, permit applications, loading, on and off-site transportation, and disposal at an approved disposal site.

3.34. OILS

3.34.1. Contractor is required to secure samples of all oils and oily wastes located in the areas defined in this Specification. Samples shall be collected in accordance with all applicable regulations.

3.34.2. AEP Company shall secure analyses required by the applicable regulations, or by the disposal facility, of all such samples, including, but not limited to, analysis for PCB contamination.

3.34.3. For all oils which have been positively identified as being free of PCB contamination (i.e. less than 50 ppm), Contractor shall be responsible to perform all handling of such materials, including, but not limited to, removal, clean up, loading and transportation.

3.34.4. Contractor shall be responsible to pay for fees to dispose of all oils and oily waste in accordance with all applicable regulations. The Engineer shall approve all methods of disposal and disposal sites for all oils and oily waste.

3.35. GREASES

3.35.1. Contractor is required to secure samples of all greases and wastes containing grease located in the areas defined in this Specification. Samples shall be collected in accordance with all applicable regulations.

3.35.2. AEP Company shall secure analyses required by the applicable regulations, or by the disposal facility, of all such samples.

3.35.3. Contractor shall be responsible to perform all handling of such materials, including, but not limited to, removal, clean up, loading, and transportation.

3.35.4. AEP Company shall be responsible for the disposal of all special and hazardous greases and waste containing greases in accordance with all applicable regulations.

3.36. PROCESS MATERIALS

3.36.1. Contractor is required to perform the work described herein in a manner that will separate process demolition debris from ferrous scrap, combustible debris, non-ferrous scrap, construction / demolition waste, oils and greases, hazardous wastes, and all other materials.

3.36.2. Prior to the start of demolition in an area, Contractor shall identify all quantities of process materials to the Engineer. The Engineer shall positively identify all such materials as being process materials.

3.37. PCBs AND EQUIPMENT CONTAINING PCBs

3.37.1. Prior to dismantling, Contractor shall conduct a survey of each dismantling area to locate and identify any electrical or hydraulic equipment which has not been clearly identified as being free of PCB contamination and, therefore, may contain PCBs. Contractor shall provide the Engineer with the location and description of any surveyed equipment which may contain PCBs. Where so directed by AEP Company, Contractor shall provide AEP Company with a sample of the oil contained in the piece of equipment. AEP Company will secure analysis and provide Contractor with the written results.

3.37.2. Prior to dismantling the facility, the Contractor shall remove, intact each piece of PCB contaminated equipment. Contractor shall transport said PCB equipment to AEP Company's designated PCB storage facility. Contractor shall schedule and coordinate said deliveries with the Engineer. Alternatively, at the direction of the Engineer, Contractor shall load PCB equipment onto vehicles provided by AEP Company. Contractor shall schedule and coordinate said loading with the Engineer. Contractor shall schedule and coordinate the pumping and removal of PCB dielectric fluid from transformers prior to loading when so directed by the Engineer.

3.37.3. AEP Company shall be responsible for the disposal of all PCB equipment and fluids.

3.38. PIPING SYSTEMS

3.38.1. Prior to the commencement of dismantling work, Contractor shall identify, plan and perform all piping shut offs, disconnections, and relocation work necessary to complete the work specified in a safe, orderly manner.

3.38.2. Piping shall be purged (where necessary) and shall be removed to a point of origin as designated by the Engineer.

3.38.3. Contractor shall submit plans, procedures and working drawings showing design details for all piping work to the Engineer for review. Contractor shall secure the Engineer's review of all designs, plans and procedures prior to the commencement of work. The correctness of the design shall remain the Contractors responsibility.

3.38.4. Contractor shall provide all supervision, labor, materials, tools and equipment necessary to complete all piping work required for the work as specified herein. Contractor shall be responsible for the identification of all piping construction, disconnection and relocation work, which will be required to complete all work specified herein.

3.38.5. Contractor shall perform all piping construction, disconnection and relocation work using methods which will not interrupt AEP Company's ongoing operations.

3.38.6. Secure the Engineer's permission prior to any utility outage. In the absence of the Engineer's approval of Contractor's proposed outage, Contractor shall perform the proposed work on live pressurized lines.

3.39. ELECTRICAL SYSTEMS

3.39.1. Prior to the commencement of dismantling work, Contractor shall identify, plan and perform all electrical shut offs, disconnections, and relocation work necessary to complete the work specified in a safe and orderly manner.

3.39.2. Conduit, cable, wireways, and buss shall be removed to a point of origin as designated by the Engineer.

3.39.3. Contractor shall submit plans, procedures and working drawings showing design details for all electrical and related work to the Engineer for review. Contractor shall secure the Engineer's review of all designs prior to the commencement of work. The correctness of design shall remain the

Contractor's responsibility.

3.39.4. Contractor shall provide all supervision, labor, materials, tools and equipment necessary to complete all electrical, telecommunication and telemetering work required for the dismantling work specified herein. Contractor shall be responsible for the identification of all electrical, telecommunication and telemetering construction, disconnection and relocation work which will be required to complete all work specified herein.

3.39.5. Contractor shall perform all electrical construction, disconnection and relocation work using methods which will not interrupt AEP Company's ongoing operations.

3.39.6. Contractor shall secure the Engineer's permission prior to any utility outage. In the absence of the Engineer's approval of Contractor's proposed outage, Contractor shall perform the proposed work on live energized lines.

4. WORK BY PURCHASER:

AEP Company Shall:

4.1. Provide Safety Data Sheets (SDS) in accordance with OSHA "Right to Know" regulations for each substance listed under said regulations.

4.2. Provide, where available, utility services such as 460 Volt, 3 phase, 60 Hz power, 250 Volt DC current, potable water, oxygen, compressed air, or natural gas, which are deemed available by AEP Company. Contractor may, at his own expense and approval of the Engineer, make necessary connections provided there is no interruption to normal production operations. AEP Company assumes no responsibility or liability for loss of, or damage to, the equipment or materials of the Contractor or his subcontractors. Contractor will pay charges that may be assessed. The assessment of charges and/or the availability of utilities may change through the course of the contract as determined.

4.3. Provide existing railroad tracks, railroad tracks sidings, and roadways on plant site, if available, for Contractor's use when and where the Engineer may designate. Contractor shall keep traffic lanes free of congestion so as to avoid interference with normal plant operations.

4.4. Provide one copy of all available drawings necessary for the completion of the work specified. These drawings are to be used by the Contractor for reference only in the performance of the work. Said drawings are not to be construed as a complete description of the Scope of Work, nor as fully depicting existing conditions. Additional copies may be purchased by Contractor through the Purchaser.

4.5. Approve the selection of all subcontractors before they will be allowed to enter the job site and perform work. Subcontractors are subject to all applicable terms and conditions contained herein.

4.6. Provide written releases for the demolition of each specific area or facility as identified in the Schedule of Values. Demolition shall not commence without the receipt of said release.

4.7. Assign to Contractor ownership of each facility to be dismantled. The assignment shall include:

4.7.1. All ferrous and non-ferrous scrap resulting from the dismantling work

4.7.2. All ferrous and non-ferrous scrap located within each dismantling area as identified by Engineer during the site visitation.

4.7.3. Spare parts and/or spare equipment.

4.7.4. All railroad track designated for removal.

4.7.5. All vehicles and mobile equipment located within each dismantling area as identified in the Specification.

4.8. AEP Company will maintain ownership of all real estate

5. Asbestos

5.1. This conceptual estimate does not include the cost for the removal or disposal of asbestos containing materials.

6. Landfill

6.1. This conceptual cost estimate does not include the cost for the closure or capping of any landfill(s), if present.

7. Clearwater Pond

7.1. This conceptual estimate includes backfilling the Clearwater pond on the south side of the west wastewater pond from EL. 375' up to surrounding grade elevation with berm material currently surrounding there existing pond as well as crushed concrete material from the demolition efforts.

8. Ash Pond / Fly Ash Pond

8.1. This conceptual cost estimate does not include the cost for any water filtering, discharge, or capping of any pond(s), if present.

9. Resale Equipment Value

9.1. Brandenburg does not believe that any equipment holds a resale value greater than the anticipated scrap value of said equipment; therefore, no resale of equipment has been included.

10. Pricing

| Description | Cost |
|---|---|
| General Conditions | $184,500.00 |
| Environmental | $450,000.00 |
| Unit 1 and 2 Demolition | $7,090,775.00 |
| Stack | $475,000.00 |
| Cooling Towers | $1,200,000.00 |
| River Cells | $5,300,000.00 |
| Flowable Fill | $990,000.00 |
| Clearwater Pond | $717,000.00 |
| Total | $16,407,275.00 |

Total Cost = $38,717,775.00

Scrap Revenue = ($22,310,500.00)

# Volumes

| **Demolition Material** | **Volume** |
|---|---|
| Concrete | 66,200 yards |
| Demolition Debris | 16,342 yards |
| Scrap Ferrous Steel | 132,374 tons |
| Scrap Non-ferrous Steel | 1,836,829 lbs |
| Oils/Greases | 15,000 gallons |
| Clearwater Pond Backfill | 81,700 yards |

Berrien Springs Hydroelectric Plant

# CONCEPTUAL DEMOLITION COST ESTIMATE

Prepared for:
Indiana Michigan Power Company (Owner)
and American Electric Power Service Corporation

Project No. 13465-000
February 12, 2016
Revision 0

55 East Monroe Street
Chicago, IL 60603-5780 USA

# Issue Summary Page

| Revision Number | Date | Purpose | Prepared By | Reviewed By | Approved By | Pages Affected |
|---|---|---|---|---|---|---|
| A | 01/28/16 | Comments | R. C. Kinsinger | A.D. Chapin<br>D. F. Franczak | M. N. Ozan | All |
| 0 | 02/12/16 | Use | R. C. Kinsinger<br>RKinsinger RC | A.D. Chapin<br>AChapin<br>D. F. Franczak<br>D.F. Franczak | T. J. Meehan | All |

## TABLE OF CONTENTS

## 1.0 INTRODUCTION

The Berrien Springs Hydroelectric Plant located in the City of Berrien Springs, Michigan is owned and operated by Indiana Michigan Power Company (I&M), a subsidiary of American Electric Power (AEP). The plant consists of two (2) earthen dams separated by a concrete spillway, rollway section and powerhouse. The powerhouse and adjacent penstock sections are located between the left embankment and the rollway sections. Each of the two (2) open flume penstock sections feed six (6) Flygt generating units which were installed in 1995 with a total capacity rating of 7,200 kW. The two (2) original generating units located in the powerhouse were abandoned in place and the other two (2) of the four (4) units were removed. Trash racks and a log boom are located upstream of the penstock sections. The control room for the hydroelectric components is located in the powerhouse.

AEP recently contracted S&L to prepare conceptual demolition cost estimates considering three (3) retirement options defined as follows: (1) Option 1, Non-Power Operation, (2) Option 2, Partial Removal of the Dam Structures, and (3) Option 3, Complete Removal of the Dam and Powerhouse. Also, in addition S&L was requested to prepare a separate Asbestos Removal Conceptual Cost Estimate.

The objective of the conceptual demolition cost estimates is to determine the gross demolition costs for Berrien Springs Hydroelectric Plant (including gross salvage credits and any other benefits), in support of documenting a component of future AEP book depreciation rates to be approved by the I&M's state commissions and potential future inclusion in submittal of a rate case to the state commissions, and other potential uses. The cost estimate considers the demolition/dismantlement methodology which complies with current OSHA rules and regulations.

## 2.0 COST ESTIMATE SUMMARY

Conceptual Demolition Cost Estimate No. 33705B, dated February 12, 2016, was prepared and is included as Exhibit 2. This cost estimate was prepared for retirement option 3, but includes accounts allowing the determination of cost estimates for retirement options 1 and 2 as well. A summary of the conceptual demolition cost estimates for all three (3) retirement options is provided in Exhibit 1 and detailed in the following tables.

The cost estimate is structured into a code of accounts as identified in Table 2-1.

**Table 2-1**
**Cost Estimate Code of Accounts**

| Account Number | Description |
|---|---|
| 10, 21 | Demolition Costs (including steel, equipment & piping scrap value) |
| 18 | Scrap Value Costs |
| 91 | Other Direct & Construction Indirect Costs |
| 93 | Indirect Costs |
| 94 | Contingency Costs |
| 96 | Escalation Costs |

The results of the cost estimate for retirement option 3 are provided in Table 2-2 below.

**Table 2-2**
**Cost Estimate Results Summary**
**Retirement Option 3**

| Description | Total Cost |
|---|---|
| Demolition Cost | $9,416,995 |
| Scrap Value | ($226,765) |
| Direct Cost Subtotal | $9,190,231 |
| Indirect Cost | $942,000 |
| Contingency Cost | $2,106,000 |
| Escalation Cost | $0 |
| Total Project Cost | $12,238,230 |

The results of the cost estimate for retirement option 1 are provided in Table 2-3 below.

**Table 2-3**
**Cost Estimate Results Summary**
**Retirement Option 1**

| Description | Total Cost |
|---|---|
| Demolition Cost | $177,529 |
| Scrap Value | ($113,105) |
| Direct Cost Subtotal | $64,424 |
| Indirect Cost | $6,000 |
| Contingency Cost | $53,600 |
| Escalation Cost | $0 |
| Total Project Cost | $124,024 |

The results of the cost estimate for retirement option 2 are provided in Table 2-4 below.

**Table 2-4**
**Cost Estimate Results Summary**
**Retirement Option 2**

| Description | Total Cost |
|---|---|
| Demolition Cost | $6,189,535 |
| Scrap Value | ($186,641) |
| Direct Cost Subtotal | $6,002,895 |
| Indirect Cost | $615,000 |
| Contingency Cost | $1,389,400 |
| Escalation Cost | $0 |
| Total Project Cost | $8,007,295 |

Asbestos Removal Conceptual Cost Estimate No. 33737B, dated February 12, 2016, was prepared and is included as Exhibit 3. The total estimated cost for asbestos removal prior to plant dismantlement is $5,100. Quantities were derived from drawings and past experience. The cost of asbestos removal is excluded from the total conceptual demolition cost estimates for each retirement option detailed in the tables above.

## 3.0 TECHNICAL BASIS

The scope of dismantlement is based on three (3) retirement options, as requested by AEP, as follows:

Retirement Option 1, Non-Power Operation: This scenario would consider leaving intact all of the existing water-impounding structures and the powerhouse. Only the electric generating units and their auxiliary equipment would be removed so as to preclude the generation of electricity by the former hydroelectric plant. In addition, the spillway would be modified as required in order to pass river flows and maintain the impoundment's water surface elevation at the current conditions.

Retirement Option 2, Partial Removal of the Dam Structures: This scenario would consider demolition and removal of certain elements of the hydroelectric site in order to drain the existing impoundment and create a natural river channel through the dam site. This would generally include removal of the generating units and powerhouse and possibly but not inclusively demolition and removal of substantial portions of concrete spillway structures. This option would address the removal and stabilization of any sediments that have accumulated at the upstream end of the dam and the stabilization of the newly exposed reservoir/riverbanks.

Retirement Option 3, Complete Removal of the Dam and Powerhouse: This scenario would consider complete removal of the electric generating components and powerhouse and complete removal of the dam. Similar to option 2, this option would address the removal and stabilization of any sediments that have accumulated at the upstream end of the dam and the stabilization of the newly exposed reservoir/riverbanks.

The scope of dismantlement for each retirement option, as interpreted from the definitions above, are identified on marked plant drawings included as Exhibit 4. The scope of dismantlement and the sequence of demolition for each retirement option are defined on these sketches.

Retirement options 2 and 3 include the same demolition work as retirement option 1, removal of the generating unit components from the powerhouse. The powerhouse is not removed in retirement option 1, but is removed in retirement option 3. For retirement option 2 the powerhouse may or may not be removed, depending on if removal of portions of the dam can restore river flow to natural flow without removing the powerhouse (refer to Exhibit 4).

For each of the retirement options the scope of sediment removal is based on the quantity that would be disturbed from the demolition work itself and not complete removal of all sediment potentially disturbed by the partial or complete removal of the dam. The subcontractor costs included in retirement options 2 and 3 are for lime stabilization of the sediment and removal of the sediment and other wastes (such as timber) to the waste disposal site. These costs do not apply to retirement option 1 since only generating unit components in the powerhouse are removed and this material has scrap value.

Retirement options 2 and 3 include the stabilization of newly exposed riverbanks, which include the dam area and areas upstream of the dam. The extent of stabilization for retirement option 3 may be slightly more than retirement option 2, since the entire dam is being removed in retirement option 3.

The following are excluded from the scope of the conceptual demolition cost estimates:

- Asbestos removal (separate cost estimate prepared).
- The conceptual demolition cost estimate includes the cost to remove the one (1) main power transformer located in the switchyard, but not the cost to remove the switchyard itself (and remaining components in the switchyard).
- The existing fish ladder will remain in place.
- Evaluation of the effect of the complete removal of the series of dams on the river watershed.
- Evaluation of the effect of the removal of any one dam, on either the upstream or downstream side dam and reservoir, after removal of the dam.
- Potential social or environmental impact of the draining of the reservoirs and the impact on property values or other community impact.
- The conceptual demolition cost estimate excludes any costs related to performing surveys to quantify the amount of sediment and chemical testing of the sediment. The quantity of sediment to be removed was estimated for retirement options 2 and 3 and the cost to remove the sediment is included in the conceptual demolition cost estimate. As stated above, the scope of sediment removal is based on the quantity that would be disturbed from the demolition work itself and not complete removal of the sediment potentially disturbed by the partial or complete removal of the dam.

The scope of the demolition cost estimate was reaffirmed during a review of the facility by two S&L employees in conjunction with a representative from Bradenburg Industrial Service Co. and AEP corporate and plant personnel. The facility review was held on Wednesday December 16, 2015.

## 4.0 COMMERCIAL BASIS

### 4.1 General Information

The Conceptual Demolition Cost Estimates prepared for the Berrien Springs Hydroelectric Plant is a conceptual estimate of the cost to dismantle the powerhouse and dam in accordance with the scope defined for each of the three (3) retirement options. Costs were calculated for (1) demolition of existing plant structures and equipment and associated site restoration costs, (2) scrap value of steel, copper and stainless steel, as applicable, (3) associated indirect costs, and (4) contingency.

All units used in the cost estimate are U.S. Standard and all costs are in US Dollars (4$^{th}$ Quarter 2015 levels). A three (3) year demolition schedule is anticipated for retirement option 3 including asbestos removal (to be performed prior to start of demolition work). The schedule takes into consideration environmental permitting, asbestos removal which includes mapping out all asbestos contamination throughout the powerhouse and associated abatement, followed by total plant demolition and site restoration. The schedule for the other two (2) retirement options would be correspondingly less.

### 4.2 Quantities/Material Cost

Quantities of pieces of equipment and/or bulk material commodities used in the cost estimates were intended to be reasonable and representative of projects of this type. Material quantities were estimated from the hydroelectric plant drawings and data provided by AEP, and the information obtained from Plant personnel during the facility review.

### 4.3 Construction Labor Wages

Craft labor rates (Craft Hourly Rate) for the cost estimate were calculated as Union Labor rates for South Bend, Indiana, based on 2015, R. S. Means “Labor Rates for the Construction Industry”. The craft rates were incorporated into work crews appropriate for the activities by adding allowances for small tools, construction equipment, insurance, and site overheads to arrive at crew hourly rates detailed in the cost estimate. A 1.10 regional labor productivity multiplier was included based on Compass International Global Construction Yearbook, 2015 Edition, for union work in Indiana. National Maintenance

Agreement Rates (typically negotiated by AEP) do not apply as this work is assumed to be performed as a lump sum contract.

### 4.3.1 Labor Work Schedule and Incentives

The estimate assumed a 5x8 work week. No per diem or other labor incentives are included.

### 4.3.2 Construction Indirects

Allowances were included in the cost estimate as direct costs as noted for the following:

- Freight: Material and scrap freight included in the material and scrap costs.
- Additional Crane Allowance: None included. Cost of cranes and construction machinery are included in the labor wage rates.
- Mobilization and Demobilization: Included in labor wage rates.
- Scaffolding: Included in labor wage rates.
- Consumables: Included in material and labor costs.
- Per Diem Costs: Excluded from the estimate.
- Contractor's General and Administrative Costs and Profit: Included in the labor wage rates.

## 4.4 Scrap Value

The value of scrap was determined by a 3 month average (November and December 2015 and January 2016) using Zone 4 (USA Midwest) of the "Scrap Metals Market Watch" (www.americanrecycler.com).

Since the values obtained are delivered pieces, 25% of the values obtained were deducted to pay for separation, preparation and shipping to the mills. This resulted in realized prices of:

- Mixed Steel Value @ $118/Ton
- Copper Value @ $3,180/Ton
- Stainless Steel @ $675/Ton

Note: 1 Ton = 2,000 Lbs

All steel is considered to be mixed steel unless otherwise noted.

## 4.5 Indirect Costs

Allowances were included in the cost estimate as indirect costs as noted for the following:

- Engineering, Procurement and Project Services: None included.
- Construction Management Support: None included.
- Owners Cost: Included as 10.0% of the total direct cost. Owners Costs include owner project engineering, administration and construction management, permits and fees, legal expenses, taxes, removal of chemicals, etc.

## 4.6 Escalation

No allowance for escalation was included in the cost estimate. All costs are determined in 4$^{th}$ Quarter 2015 levels.

## 4.7 Contingency

Allowances were included in the cost estimate as contingency as noted for the following:

- Scrap Value: Included as 15.0% reduction in the salvage value resulting in a total net reduction in the salvage value. The contingency assumes a potential drop in salvage value thus increasing the project cost. Scrap costs are very volatile but by taking a 3-month average some of the effect of volatility is reduced. However there are other variables that affect scrap pricing such as the quantity and processing fees. The contingency applied is based on the estimators confidence in scrap pricing used in the demolition cost estimate.
- Material: Included as 20.0% of the total material cost.
- Labor: Included as 20.0% of the total labor cost.
- Indirect: Included as 20.0% of the total indirect cost.
- Subcontractor: Included as 20.0% of the total subcontractor cost.

## 4.8 Assumptions

The following assumptions apply to the cost estimates.

- The cost estimate for each retirement option is based on the scope and the demolition sequences defined on the sketches provided in Exhibit 4.
- All chemicals will be removed by the Owner prior to demolition, from the facilities to be demolished.

- All electrical equipment and wiring is de-energized prior to start of dismantlement, except for that required for remote operation of the spillway gates after demolition is completed for retirement option 1.
- No extraordinary environmental costs for demolition have been included.
- Handling, on-site and off-site disposal of hazardous materials would be performed in compliance with methods approved by Owner.
- The window glazing in the powerhouse may be asbestos contaminated and an allowance for removal and disposal is included in the asbestos removal cost estimate. There is no building or pipe insulation in the facility and consequently no insulation related asbestos contamination.
- Switchyards within the plant boundaries are not part of the scope, neither are access roads to these facilities. Fences and gates needed to protect the switchyard will be left in place.
- All demolished materials are considered debris, except for organic combustibles and non-embedded metals which have scrap value.
- The basis for salvage estimating is for scrap value only. No resale of equipment or material is included.
- Sediment removed due to demolition work is treated with lime and hauled offsite to an approved waste disposal facility.

## 5.0 REFERENCES

**5.1** Berrien Springs Plant Drawings: One-Line Diagrams, No. 12-12001-2, 10/30/07 and No. W-1000, Revision 17.

**5.2** Spaulding Consultants, LLC, Supporting Technical Information Document, Berrien Springs Hydroelectric Project, November, 2007.

.

# EXHIBIT 1
# Berrien Springs Hydroelectric Plant
# Conceptual Demolition Cost Estimate Summary

Berrien Springs Hydroelectric Plant
Indiana Michigan Power Company
American Electric Power Service Corporation
Estimate Number: 33705B

February 12, 2016

| | Retirement Option 1 | Retirement Option 2 | Retirement Option 3 |
|---|---|---|---|
| Demolition Cost | $ 177,529 | $ 6,189,535 | $ 9,416,995 |
| Scrap Value | $ (113,105) | $ (186,641) | $ (226,765) |
| Direct Cost Subtotal | $ 64,424 | $ 6,002,895 | $ 9,190,231 |
| Indirect Cost | $ 6,000 | $ 615,000 | $ 942,000 |
| Contingency Cost | $ 53,600 | $ 1,389,400 | $ 2,106,000 |
| Escalation Cost | $ - | $ - | $ - |
| Total Demolition Cost | $ 124,024 | $ 8,007,295 | $ 12,238,230 |

# EXHIBIT 2
# Berrien Springs Hydroelectric Plant
# Conceptual Demolition Cost Estimate No. 33705B

# AEP BERRIEN SPRINGS
# HYDROELECTRIC PLANT DISMANTLEMENT STUDY
# CONCEPTUAL COST ESTIMATE

| | |
|---|---|
| **Client** | AEP |
| **Estimator** | RCK |
| **Labor rate table** | 15INSOU |
| **Project No.** | 13465-000 |
| **Station Name** | BERRIEN SPRINGS |
| **Unit** | ALL |
| **Estimate Date** | 02/12/2016 |
| **Reviewed By** | ADC |
| **Approved By** | MNO |
| **Estimate No.** | 33705B |
| **Estimate Class** | Conceptual |
| **Cost index** | INSOU |

**AEP BERRIEN SPRINGS**
**HYDROELECTRIC PLANT DISMANTLEMENT STUDY**
**CONCEPTUAL COST ESTIMATE**



| Area | Description | Subcontract Cost | Scrap Value | Material Cost | Man Hours | Labor Cost | Total Cost |
|---|---|---|---|---|---|---|---|
| ACCOUNT A | DEMOLITION ACCOUNT A | | (113,105) | 27,930 | 1,746 | 149,599 | 64,424 |
| ACCOUNT B | DEMOLITION ACCOUNT B | 782,260 | (73,536) | 2,644,808 | 33,942 | 2,584,938 | 5,938,471 |
| ACCOUNT C | DEMOLITION ACCOUNT C | 1,456,400 | (40,124) | 2,863 | 19,762 | 1,768,197 | 3,187,336 |
| | TOTAL DIRECT | 2,238,660 | (226,765) | 2,675,601 | 55,450 | 4,502,734 | 9,190,231 |

## Estimate Totals

| Description | Amount | Totals | Hours |
|---|---|---|---|
| **Direct Costs:** | | | |
| Labor | 4,502,734 | | 55,450 |
| Material | 2,675,601 | | |
| Subcontract | 2,238,660 | | |
| Scrap Value | (226,765) | | |
| | **9,190,230** | **9,190,230** | |
| **Other Direct & Construction Indirect Costs:** | | | |
| 91-1 Scaffolding | | | |
| 91-2 Cost Due To OT 5-10's | | | |
| 91-3 Cost Due To OT 6-10's | | | |
| 91-4 Per Diem | | | |
| 91-5 Consumables | | | |
| 91-8 Freight on Material | | | |
| 91-9 Freight on Process Equip | | | |
| 91-10 Sales Tax | | | |
| 91-11 Contractors G&A | | | |
| 91-12 Contractors Profit | | | |
| | | **9,190,230** | |
| **Indirect Costs:** | | | |
| 93-1 Engineering Services | | | |
| 93-2 CM Support | | | |
| 93-3 Start-Up/Commissioning | | | |
| 93-4 Start-Up/Spare Parts | | | |
| 93-5 Excess Liability Insur. | | | |
| 93-6 Sales Tax On Indirects | | | |
| 93-7 Owners Cost | 942,000 | | |
| 93-8 EPC Fee | | | |
| | **942,000** | **10,132,230** | |
| **Contingency:** | | | |
| 94-1 Contingency on Material | 535,000 | | |
| 94-2 Contingency on Labor | 901,000 | | |
| 94-3 Contingency on Sub. | 448,000 | | |
| 94-6 Contingency on Scrap | 34,000 | | |
| 94-5 Contingency on Indirect | 188,000 | | |
| | **2,106,000** | **12,238,230** | |
| **Escalation:** | | | |
| 96-1 Escalation on Material | | | |
| 96-2 Escalation on Labor | | | |
| 96-3 Escalation on Subcontract | | | |
| 96-4 Escalation on Scrap | | | |
| 96-5 Escalation on Indirects | | | |
| | | **12,238,230** | |
| ***Total*** | | ***12,238,230*** | |

| Area | Group | Phase | Description | Notes | Quantity | Man Hours | Crew Rate | Labor Cost | Material Cost | Subcontract Cost | Scrap Value | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ACCOUNT A | | | DEMOLITION ACCOUNT A | | | | | | | | | |
| | 10.00.00 | | WHOLE PLANT DEMOLITION | | | | | | | | | |
| | | 10.31.00 | MECHANICAL EQUIPMENT | | | | | | | | | |
| | | | DEMO .6 MW FLYGT GENERATOR | 12 GENERATORS AT 9500# EA | 57.00 TN | 564 | 85.53 /MH | 48,269 | | - | | 48,269 |
| | | | DEMO FLYGT TURBINE AND GEARS | 12 GENERATORS AT 14000# EA | 84.00 TN | 832 | 85.53 /MH | 71,134 | | - | | 71,134 |
| | | | DEMO HOIZONTAL CAMELBACK GENERATOR | 2 GENERATORS AT 14000# EA | 14.00 TN | 139 | 85.53 /MH | 11,856 | | - | | 11,856 |
| | | | TURBINE ROOM 5 TON GANTRY CRANE | | 5.00 TN | 50 | 121.33 /MH | 6,006 | | - | | 6,006 |
| | | | MECHANICAL EQUIPMENT | | | 1,584 | | 137,265 | | | | 137,265 |
| | | | WHOLE PLANT DEMOLITION | | | 1,584 | | 137,265 | | | | 137,265 |
| | 18.00.00 | | SCRAP VALUE | | | | | | | | | |
| | | 18.10.00 | MIXED STEEL | | | | | | | | | |
| | | | MIXED STEEL | .6 MW FLYGT GENERATOR, 12 @5,225# EA | -31.00 TN | | 79.62 /MH | | - | - | (3,660) | (3,660) |
| | | | MIXED STEEL | DEMO FLYGT TURBINE AND GEARS | -84.00 TN | | 79.62 /MH | | - | - | (9,919) | (9,919) |
| | | | MIXED STEEL | DEMO HOIZONTAL CAMELBACK GENERATOR, 2 @ 4.2 TN EA | -8.40 TN | | 79.62 /MH | | - | - | (992) | (992) |
| | | | MIXED STEEL | TURBINE ROOM 5 TON GANTRY CRANE | -5.00 TN | | 79.62 /MH | | - | - | (590) | (590) |
| | | | MIXED STEEL | | | | | | | | (15,161) | (15,161) |
| | | 18.30.00 | COPPER | | | | | | | | | |
| | | | COPPER | 12 - .6 MW FLYGT GENERATOR 12@ 4,275 LB EA | -25.60 TN | | 79.62 /MH | | - | - | (81,408) | (81,408) |
| | | | COPPER | DEMO HOIZONTAL CAMELBACK GENERATOR, 2 @ 2.6 TN EA | -5.20 TN | | 79.62 /MH | | - | - | (16,536) | (16,536) |
| | | | COPPER | | | | | | | | (97,944) | (97,944) |
| | | | SCRAP VALUE | | | | | | | | (113,105) | (113,105) |
| | 22.00.00 | | CONCRETE | | | | | | | | | |
| | | 22.13.00 | Concrete | | | | | | | | | |
| | | | FLOWABLE FILL, 1500 PSI | FILL PENSTOCKS TO PREVENT BYPASS FLOW | 294.00 CY | 162 | 76.27 /MH | 12,334 | 27,930 | - | - | 40,264 |
| | | | Concrete | | | 162 | | 12,334 | 27,930 | | | 40,264 |
| | | | CONCRETE | | | 162 | | 12,334 | 27,930 | | | 40,264 |
| | | | ACCOUNT A DEMOLITION ACCOUNT A | | | 1,746 | | 149,599 | 27,930 | | (113,105) | 64,424 |
| ACCOUNT B | | | DEMOLITION ACCOUNT B | | | | | | | | | |
| | 10.00.00 | | WHOLE PLANT DEMOLITION | | | | | | | | | |
| | | 10.22.00 | CONCRETE | | | | | | | | | |
| | | | EQUIPMENT/ BUILDING FOUNDATION | TAINTER GATE - TOP PORTION: WEIR, ENDWALL, GATE WALLS & HEAD WALL | 2,197.00 CY | 2,719 | 89.94 /MH | 244,552 | | - | - | 244,552 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | GRAVITY DAM - TOP PORTION OF DAM | 697.00 CY | 863 | 89.94 /MH | 77,584 | | - | - | 77,584 |
| | | | CONCRETE | | | 3,582 | | 322,137 | | | | 322,137 |
| | | 10.23.00 | STEEL | | | | | | | | | |
| | | | STRUCTURAL AND GIRT STEEL | TAINTER GATES STRUCTURE AND WALKWAY | 44.90 TN | 50 | 79.62 /MH | 3,996 | | - | - | 3,996 |
| | | | STRUCTURAL AND GIRT STEEL | GRAVITY DAM TOP PORTION OF DAM: STREEL AND WALKWAY | 35.50 TN | 40 | 79.62 /MH | 3,159 | | - | - | 3,159 |
| | | | STEEL | | | 90 | | 7,155 | | | | 7,155 |
| | | 10.31.00 | MECHANICAL EQUIPMENT | | | | | | | | | |
| | | | 80 KW PROPANE ELECTRIC GENERATOR | | 1.50 TN | 3 | 121.33 /MH | 405 | | - | | 405 |
| | | | BAR RACKS | 4 AT 5 TONS EACH | 20.00 TN | 45 | 121.33 /MH | 5,406 | | - | | 5,406 |
| | | | TAINTER GATES | 6 AT 5 TONS EACH | 30.00 TN | 67 | 121.33 /MH | 8,109 | | - | | 8,109 |
| | | | STOP LOGS | 6 AT 5 TONS EACH | 30.00 TN | 67 | 121.33 /MH | 8,109 | | - | | 8,109 |
| | | | MECHANICAL EQUIPMENT | | | 182 | | 22,029 | | | | 22,029 |
| | | 10.41.00 | ELECTRICAL EQUIPMENT | | | | | | | | | |
| | | | GENERATOR BUS TRANSFORMERS | 4.16 to 34.5 KV, 6800/9068 KVA (STEEL) | 10.00 TN | 29 | 80.14 /MH | 2,356 | | - | - | 2,356 |
| | | | GENERATOR BUS TRANSFORMERS | 4.16 to 34.5 KV, 6800/9068 KVA (CU) | 5.00 TN | 15 | 80.14 /MH | 1,178 | | - | - | 1,178 |
| | | | MISCELLANEOUS ELECTRICAL EQUIPMENT | | 5.00 TN | 15 | 80.14 /MH | 1,178 | | - | - | 1,178 |
| | | | ELECTRICAL EQUIPMENT | | | 59 | | 4,711 | | | | 4,711 |
| | | 10.86.00 | WASTE | | | | | | | | | |
| | | | WASTE | MISC | 1.00 LS | 0 | 121.33 /MH | 13 | | - | 10,000 | 10,013 |
| | | | WASTE | | | 0 | | 13 | | | 10,000 | 10,013 |

| Area | Group | Phase | Description | Notes | Quantity | Man Hours | Crew Rate | Labor Cost | Material Cost | Subcontract Cost | Scrap Value | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | WHOLE PLANT DEMOLITION | | | 3,912 | | 356,045 | | | 10,000 | 366,045 |
| | 18.00.00 | | SCRAP VALUE | | | | | | | | | |
| | | 18.10.00 | MIXED STEEL | | | | | | | | | |
| | | | MIXED STEEL | 80 KW PROPANE ELECTRIC GENERATOR | -1.50 TN | | 79.62 /MH | | - | - | (177) | (177) |
| | | | MIXED STEEL | BAR RACKS | -20.00 TN | | 79.62 /MH | | - | - | (2,362) | (2,362) |
| | | | MIXED STEEL | TAINTER GATES AND WALKWAY | -44.90 TN | | 79.62 /MH | | - | - | (5,302) | (5,302) |
| | | | MIXED STEEL | STOP LOGS | -30.00 TN | | 79.62 /MH | | - | - | (3,542) | (3,542) |
| | | | MIXED STEEL | GRAVITY DAM TOP PORTION OF DAM: STREEL AND WALKWAY | -35.50 TN | | 79.62 /MH | | - | - | (4,192) | (4,192) |
| | | | MIXED STEEL | GENERATOR BUS TRANSFORMERS | -10.00 TN | | 79.62 /MH | | - | - | (1,181) | (1,181) |
| | | | MIXED STEEL | | | | | | | | (16,756) | (16,756) |
| | | 18.30.00 | COPPER | | | | | | | | | |
| | | | COPPER | CABLE | -10.00 TN | | 79.62 /MH | | - | - | (31,800) | (31,800) |
| | | | COPPER | MISC. TRANSFORMERS & MOTORS UNIT 1 | -6.00 TN | | 79.62 /MH | | - | - | (19,080) | (19,080) |
| | | | COPPER | GENERATOR BUS TRANSFORMERS | -5.00 TN | | 79.62 /MH | | - | - | (15,900) | (15,900) |
| | | | COPPER | | | | | | | | (66,780) | (66,780) |
| | | | SCRAP VALUE | | | | | | | | (83,536) | (83,536) |
| | 21.00.00 | | CIVIL WORK | | | | | | | | | |
| | | 21.17.00 | Earthwork, Excavation | | | | | | | | | |
| | | | FOUNDATION EXCAVATION, COMMON EARTH USING 1 CY BACKHOE | RIVER BED EXCAVATION FOR RIPRAP | 100.00 CY | 17 | 88.08 /MH | 1,453 | | - | - | 1,453 |
| | | | Earthwork, Excavation | | | 17 | | 1,453 | | | | 1,453 |
| | | 21.41.00 | Erosion and Sedimentation Control | | | | | | | | | |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | STREAMBED PROTECTION 47770 CY - 5689 CY ASSUMING REUSE OF CAUSEWAY STONE | 42,081.00 CY | 18,564 | 74.10 /MH | 1,375,577 | 1,721,113 | - | - | 3,096,689 |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | FOR CAUSEWAYS INSTALLATION | 5,689.00 CY | 2,510 | 74.10 /MH | 185,966 | 232,680 | - | - | 418,647 |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | REUSE CAUSEWAY RIP RAP FOR BANK PROTECTION | 5,689.00 CY | 2,510 | 74.10 /MH | 185,966 | | - | - | 185,966 |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | RIPRAP PROTECTION AT SPILLWAY FLOOR | 100.00 CY | 44 | 74.10 /MH | 3,269 | 4,090 | - | - | 7,359 |
| | | | Erosion and Sedimentation Control | | | 23,627 | | 1,750,778 | 1,957,883 | | | 3,708,661 |
| | | 21.47.00 | LANDSCAPING | | | | | | | | | |
| | | | HYDRO OR AIR SEED & MULCH & FERTILIZER | | 450.00 AC | 6,386 | 74.64 /MH | 476,661 | 686,925 | - | - | 1,163,586 |
| | | | LANDSCAPING | | | 6,386 | | 476,661 | 686,925 | | | 1,163,586 |
| | | 21.65.00 | Soil Remediation | | | | | | | | | |
| | | | REMOVAL OF LOCALIZED SILT AT DAM | LIME ADDITIVE FOR DRYING | 3,556.00 CY | | 196.64 /MH | | | 142,240 | - | 142,240 |
| | | | REMOVAL OF LOCALIZED SILT AT DAM | LOAD, MIX AND HAUL LIME AND SEDIMENT MIX 7111+3556 | 10,667.00 CY | | 196.64 /MH | | | 640,020 | - | 640,020 |
| | | | Soil Remediation | | | | | | | 782,260 | | 782,260 |
| | | | CIVIL WORK | | | 30,030 | | 2,228,893 | 2,644,808 | 782,260 | | 5,655,961 |
| | | | ACCOUNT B DEMOLITION ACCOUNT B | | | 33,942 | | 2,584,938 | 2,644,808 | 782,260 | (73,536) | 5,938,471 |
| ACCOUNT C | | | DEMOLITION ACCOUNT C | | | | | | | | | |
| | 10.00.00 | | WHOLE PLANT DEMOLITION | | | | | | | | | |
| | | 10.22.00 | CONCRETE | | | | | | | | | |
| | | | EQUIPMENT/ BUILDING FOUNDATION | TAINTER GATE - BOTTOM PORTION : APRON AND THROAT | 4,869.00 CY | 6,026 | 89.94 /MH | 541,978 | | - | - | 541,978 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | GRAVITY DAM - BOTTOM PORTION: APRON AND BASE | 838.00 CY | 1,037 | 89.94 /MH | 93,279 | | - | - | 93,279 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | EAST AND WEST PENSTOCKS - TOP PORTION | 638.00 CY | 790 | 89.94 /MH | 71,017 | | - | - | 71,017 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | EAST AND WEST PENSTOCKS - BOTTOM PORTION: APRON AND BASE | 4,284.00 CY | 5,302 | 89.94 /MH | 476,860 | | - | - | 476,860 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | GENERATOR HOUSE - TOP PORTION : WALLS | 1,106.00 CY | 1,369 | 89.94 /MH | 123,111 | | - | - | 123,111 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | GENERATOR HOUSE - BOTTOM PORTION : BASEMENT FLOOR | 1,546.00 CY | 1,913 | 89.94 /MH | 172,088 | | - | - | 172,088 |
| | | | CONCRETE | | | 16,437 | | 1,478,333 | | | | 1,478,333 |
| | | 10.23.00 | STEEL | | | | | | | | | |
| | | | STRUCTURAL AND GIRT STEEL | EAST AND WEST PENSTOCKS - TOP PORTION, STEEL DECK AND BAR RACK | 128.00 TN | 143 | 79.62 /MH | 11,391 | | - | - | 11,391 |

| Area | Group | Phase | Description | Notes | Quantity | Man Hours | Crew Rate | Labor Cost | Material Cost | Subcontract Cost | Scrap Value | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 10.23.00 | STEEL | | | | | | | | | |
| | | | STRUCTURAL AND GIRT STEEL | GENERATOR HOUSE | 221.00 TN | 247 | 79.62 /MH | 19,667 | | - | - | 19,667 |
| | | | STEEL | | | 390 | | 31,058 | | | | 31,058 |
| | | 10.24.00 | ARCHITECTURAL | | | | | | | | | |
| | | | GENERATOR HOUSE | 68'x93'x70' TALL | 442,680.00 CF | 1,899 | 89.81 /MH | 170,575 | | - | - | 170,575 |
| | | | ARCHITECTURAL | | | 1,899 | | 170,575 | | | | 170,575 |
| | | 10.31.00 | MECHANICAL EQUIPMENT | | | | | | | | | |
| | | | DEMO FLYGT PENSTOCKS | 12 GENERATORS AT 11,800# EA | 70.80 TN | 701 | 85.53 /MH | 59,956 | | - | | 59,956 |
| | | | DEMO CAMELBACK PENSTOCKS | 2 GENERATORS AT 15 TN EA | 30.00 TN | 297 | 85.53 /MH | 25,405 | | - | | 25,405 |
| | | | MECHANICAL EQUIPMENT | | | 998 | | 85,361 | | | | 85,361 |
| | | | WHOLE PLANT DEMOLITION | | | 19,724 | | 1,765,327 | | | | 1,765,327 |
| | 18.00.00 | | SCRAP VALUE | | | | | | | | | |
| | | 18.10.00 | MIXED STEEL | | | | | | | | | |
| | | | MIXED STEEL | DEMO FLYGT PENSTOCKS | -70.80 TN | | 79.62 /MH | | - | - | (8,360) | (8,360) |
| | | | MIXED STEEL | DEMO CAMELBACK PENSTOCKS | -30.00 TN | | 79.62 /MH | | - | - | (3,542) | (3,542) |
| | | | MIXED STEEL | EAST AND WEST PENSTOCKS - TOP PORTION, STEEL DECK AND BAR RACK | -128.00 TN | | 79.62 /MH | | - | - | (15,114) | (15,114) |
| | | | MIXED STEEL | GENERATOR HOUSE | -111.00 TN | | 79.62 /MH | | - | - | (13,107) | (13,107) |
| | | | MIXED STEEL | | | | | | | | (40,124) | (40,124) |
| | | | SCRAP VALUE | | | | | | | | (40,124) | (40,124) |
| | 21.00.00 | | CIVIL WORK | | | | | | | | | |
| | | 21.17.00 | Earthwork, Excavation | | | | | | | | | |
| | | | FOUNDATION EXCAVATION, COMMON EARTH USING 1 CY BACKHOE | RIVER BED EXCAVATION FOR RIPRAP (140-100) | 40.00 CY | 7 | 88.08 /MH | 581 | | - | - | 581 |
| | | | Earthwork, Excavation | | | 7 | | 581 | | | | 581 |
| | | 21.41.00 | Erosion and Sedimentation Control | | | | | | | | | |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | RIP RAP PROTECTION AT RETAINING WALLS (170-100) | 70.00 CY | 31 | 74.10 /MH | 2,288 | 2,863 | - | - | 5,151 |
| | | | Erosion and Sedimentation Control | | | 31 | | 2,288 | 2,863 | | | 5,151 |
| | | 21.65.00 | Soil Remediation | | | | | | | | | |
| | | | REMOVAL OF LOCALIZED SILT AT DAM | LIME ADDITIVE FOR DRYING | 6,620.00 CY | | 196.64 /MH | | | 264,800 | - | 264,800 |
| | | | REMOVAL OF LOCALIZED SILT AT DAM | LOAD, MIX AND HAUL LIME AND SEDIMENT MIX 7111+3556 | 19,860.00 CY | | 196.64 /MH | | | 1,191,600 | - | 1,191,600 |
| | | | Soil Remediation | | | | | | | 1,456,400 | | 1,456,400 |
| | | | CIVIL WORK | | | 37 | | 2,870 | 2,863 | 1,456,400 | | 1,462,133 |
| | | | **ACCOUNT C DEMOLITION ACCOUNT C** | | | **19,762** | | **1,768,197** | **2,863** | **1,456,400** | **(40,124)** | **3,187,336** |

# EXHIBIT 3
# Berrien Springs Hydroelectric Plant
# Asbestos Removal Conceptual Cost Estimate No. 33737B

# AEP BERRIEN SPRINGS
# HYDROELECTRIC PLANT DISMANTLEMENT STUDY - ASBESTOS REMOVAL
# CONCEPTUAL COST ESTIMATE

| | |
|---|---|
| **Client** | AEP |
| **Estimator** | RCK |
| **Labor rate table** | 15INSOU |
| **Project No.** | 13465-000 |
| **Station Name** | BERRIEN SPRINGS |
| **Unit** | ALL |
| **Estimate Date** | 02/12/2016 |
| **Reviewed By** | ADC |
| **Approved By** | MNO |
| **Estimate No.** | 33737B |
| **Estimate Class** | Conceptual |
| **Cost index** | INSOU |

**AEP BERRIEN SPRINGS**
**HYDROELECTRIC PLANT DISMANTLEMENT STUDY - ASBESTOS REMOVAL**
**CONCEPTUAL COST ESTIMATE**



| Area | Description | Subcontract Cost | Scrap Value | Material Cost | Man Hours | Labor Cost | Total Cost |
|---|---|---|---|---|---|---|---|
| ASBESTOS | ASBESTOS REMOVAL | 3,800 | | | | | 3,800 |
| | TOTAL DIRECT | 3,800 | | | | | 3,800 |

## Estimate Totals

| Description | Amount | Totals | Hours |
|---|---|---|---|
| **Direct Costs:** | | | |
| Labor | | | |
| Material | | | |
| Subcontract | 3,800 | | |
| Scrap Value | | | |
| | **3,800** | **3,800** | |
| **Other Direct & Construction** | | | |
| **Indirect Costs:** | | | |
| 91-1 Scaffolding | | | |
| 91-2 Cost Due To OT 5-10's | | | |
| 91-3 Cost Due To OT 6-10's | | | |
| 91-4 Per Diem | | | |
| 91-5 Consumables | | | |
| 91-8 Freight on Material | | | |
| 91-9 Freight on Process Equip | | | |
| 91-10 Sales Tax | | | |
| 91-11 Contractors G&A | | | |
| 91-12 Contractors Profit | | | |
| | | **3,800** | |
| **Indirect Costs:** | | | |
| 93-1 Engineering Services | | | |
| 93-2 CM Support | | | |
| 93-3 Start-Up/Commissioning | | | |
| 93-4 Start-Up/Spare Parts | | | |
| 93-5 Excess Liability Insur. | | | |
| 93-6 Sales Tax On Indirects | | | |
| 93-7 Owners Cost | 400 | | |
| 93-8 EPC Fee | | | |
| | **400** | **4,200** | |
| **Contingency:** | | | |
| 94-1 Contingency on Material | | | |
| 94-2 Contingency on Labor | | | |
| 94-3 Contingency on Sub. | 800 | | |
| 94-6 Contingency on Scrap | | | |
| 94-5 Contingency on Indirect | 100 | | |
| | **900** | **5,100** | |
| **Escalation:** | | | |
| 96-1 Escalation on Material | | | |
| 96-2 Escalation on Labor | | | |
| 96-3 Escalation on Subcontract | | | |
| 96-4 Escalation on Scrap | | | |
| 96-5 Escalation on Indirects | | | |
| | | **5,100** | |
| ***Total*** | | ***5,100*** | |

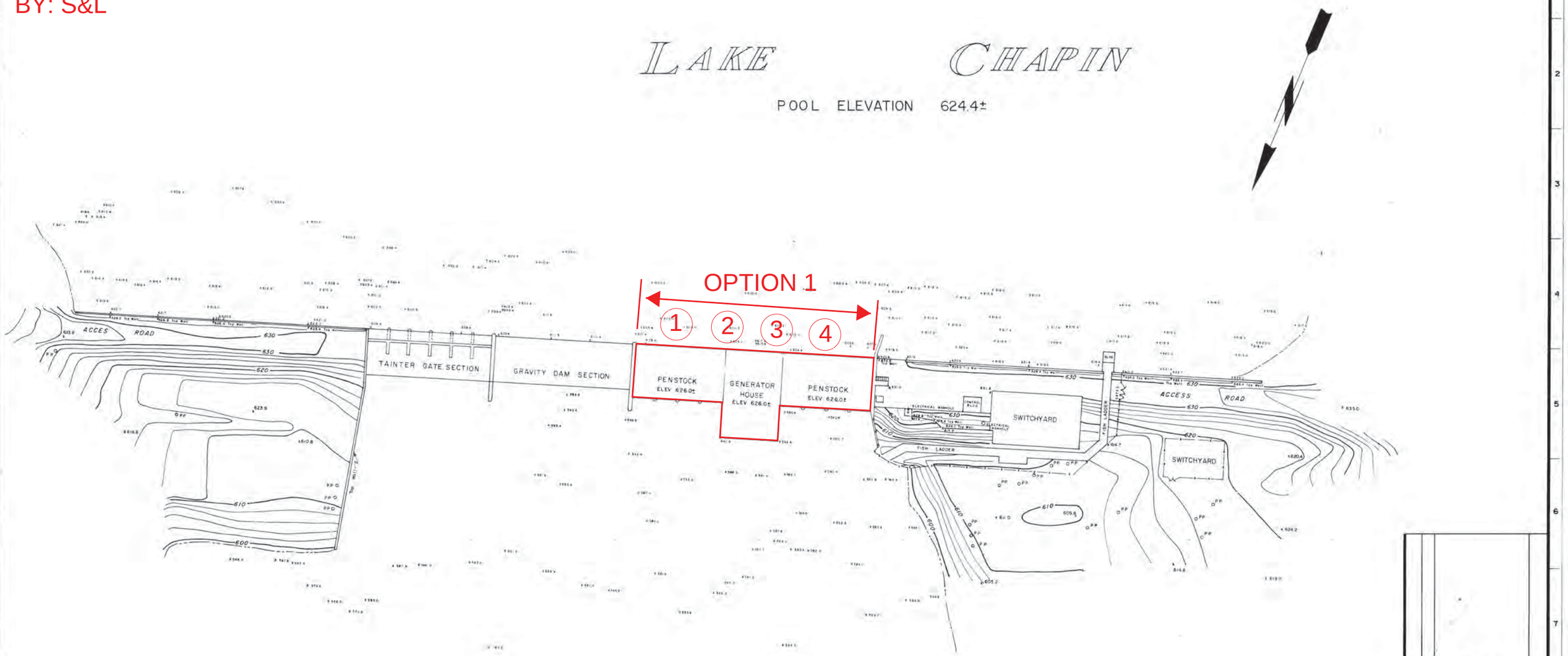
| Area | Group | Phase | Description | Notes | Quantity | Man Hours | Crew Rate | Labor Cost | Material Cost | Subcontract Cost | Scrap Value | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ASBESTOS | | | ASBESTOS REMOVAL | | | | | | | | | |
| | 10.00.00 | | WHOLE PLANT DEMOLITION | | | | | | | | | |
| | | 10.37.00 | ASBESTOS REMOVAL | | | | | | | | | |
| | | | ASBESTOS REMOVAL - MISC MATERIALS | WINDOW CAULKING MISC MATERIALS | 2.00 CY | | 121.33 /MH | | | 3,800 | - | 3,800 |
| | | | ASBESTOS REMOVAL | | | | | | | 3,800 | | 3,800 |
| | | | WHOLE PLANT DEMOLITION | | | | | | | 3,800 | | 3,800 |
| | | | ASBESTOS ASBESTOS REMOVAL | | | | | | | 3,800 | | 3,800 |

# EXHIBIT 4
# Berrien Springs Hydroelectric Plant
# Retirement Option 1-3 Demolition Scope and Sequence

DWG. NO. 14-30000

BERRIEN SPRINGS HYDRO RETIREMENT
DEMO SEQUENCE SKETCHES & CIVIL QUANTITIES
BY: S&L

JANUARY 25, 2018
PAGE 1 OF 7




PLAN
SCALE 1" = 40'

OPTION 1

1. INSTALL STOPLOGS
2. REMOVE EQUIPMENT
3. GROUT PENSTOCKS
4. REMOVE STOPLOGS

| DATE | NO. | DESCRIPTION | APPD. |
|---|---|---|---|
| 8/29/80 | 0 | ISSUED FOR CONSTRUCTION | MP |

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INDIANA MICHIGAN POWER COMPANY
BERRIEN SPRINGS HYDRO PLANT
BERRIEN SPRINGS MICHIGAN

EXITING TOPOGRAPHY

DWG. NO. 14-30000-0

ARCH. | ELEC. | MECH. | STR.

SCALES 1"=40'
DR. VS
CH. MTB
SQ. CH.
DATED 2/24/94

ENGINEERING DIVISION
APPROVED BY
DESIGN DIVISION

AMERICAN ELECTRIC POWER SERVICE CORP.

AMERICAN ELECTRIC POWER SERVICE CORP.
SURVEY AND MAPPING SECTION
INDIANA MICHIGAN ELECTRIC COMPANY
BERRIEN SPRINGS HYDRO PLANT
EAST & WEST EMBANKMENT AREAS SHOWING TOPOGRAPHY - STRUCTURES - FEATURES

FIELD APPROVAL (ENGINEERING SECTION)
DESIGNER
A.E.P. CO.

DRAWN BY JDR DATE 6/23/87
CHECKED BY KLH DATE 6/25/87
SHEET 1 OF 1
SCALE 1" = 40'

083 40/80 870609

AEP-6 6788

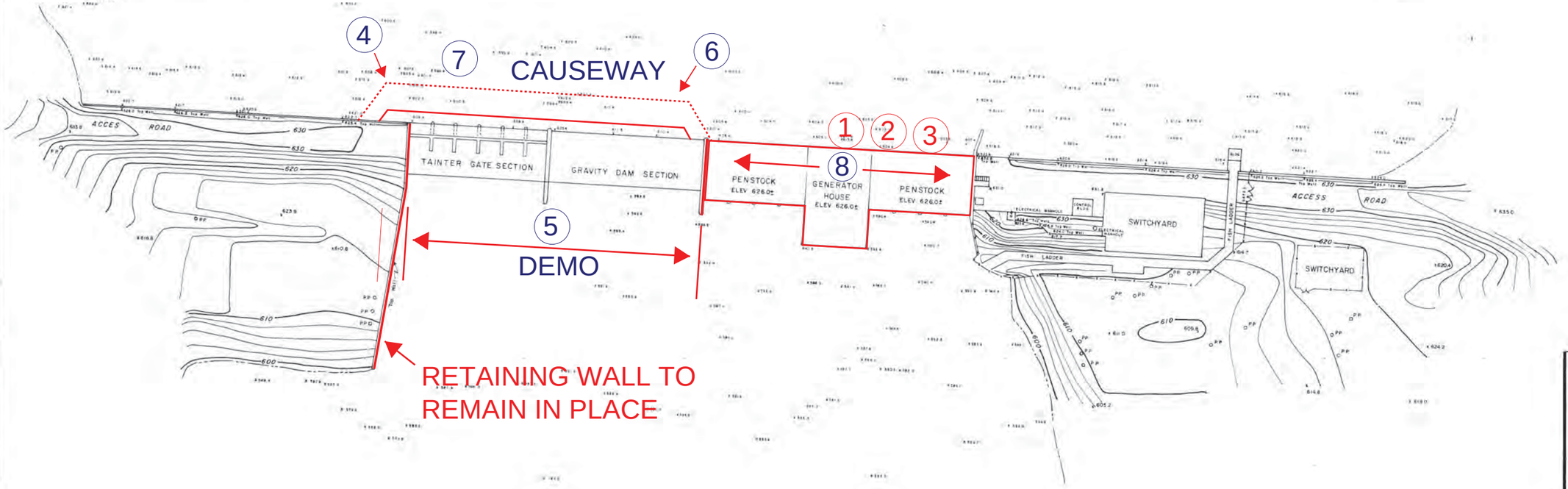
DWG. NO. 14-30000

# BERRIEN SPRINGS HYDRO RETIREMENT
# DEMO SEQUENCE SKETCHES & CIVIL QUANTITIES
BY: S&L

JANUARY 25, 2016
PAGE 2 OF 7

PHASE 1
① INSTALL STOPLOGS
② REMOVE EQUIPMENT
③ REMOVE STOPLOGS

PHASE 2
④ CONSTRUCT CAUSEWAY
⑤ DEMO TAINTER GATES & SPILLWAY SECTIONS
⑥ PLACE RIPRAP PROTECTION
⑦ REMOVE CAUSEWAY
⑧ GROUT PENSTOCKS




PLAN
SCALE 1" = 40'

# OPTION 2

ST. JOSEPH RIVER
WATER ELEVATION 598.9±
FLOW

| DATE | NO. | DESCRIPTION | APPD. |
|---|---|---|---|
| 4/29/16 | 10 | ISSUED FOR CONSTRUCTION | MH |

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INDIANA MICHIGAN POWER COMPANY
BERRIEN SPRINGS HYDRO PLANT
BERRIEN SPRINGS MICHIGAN

EXITING TOPOGRAPHY

DWG. NO. 14-30000-0

AMERICAN ELECTRIC POWER SERVICE CORP.
SURVEY AND MAPPING SECTION
INDIANA MICHIGAN ELECTRIC COMPANY
BERRIEN SPRINGS HYDRO PLANT
EAST & WEST EMBANKMENT AREAS SHOWING TOPOGRAPHY - STRUCTURES - FEATURES
FIELD APPROVAL (ENGINEERING SECTION)
DESIGNER
A.E.P. CO.
DRAWN BY JDB DATE 6/23/87
CHECKED BY RLH DATE 6/25/87
SHEET 1 OF 1
SCALE 1" = 40'
083 30/40 870609

ENGINEERING DIVISION
DESIGN DIVISION
APPROVED BY
AMERICAN ELECTRIC POWER SERVICE CORP.

AEP-6 6788

DWG. NO. 14-30000

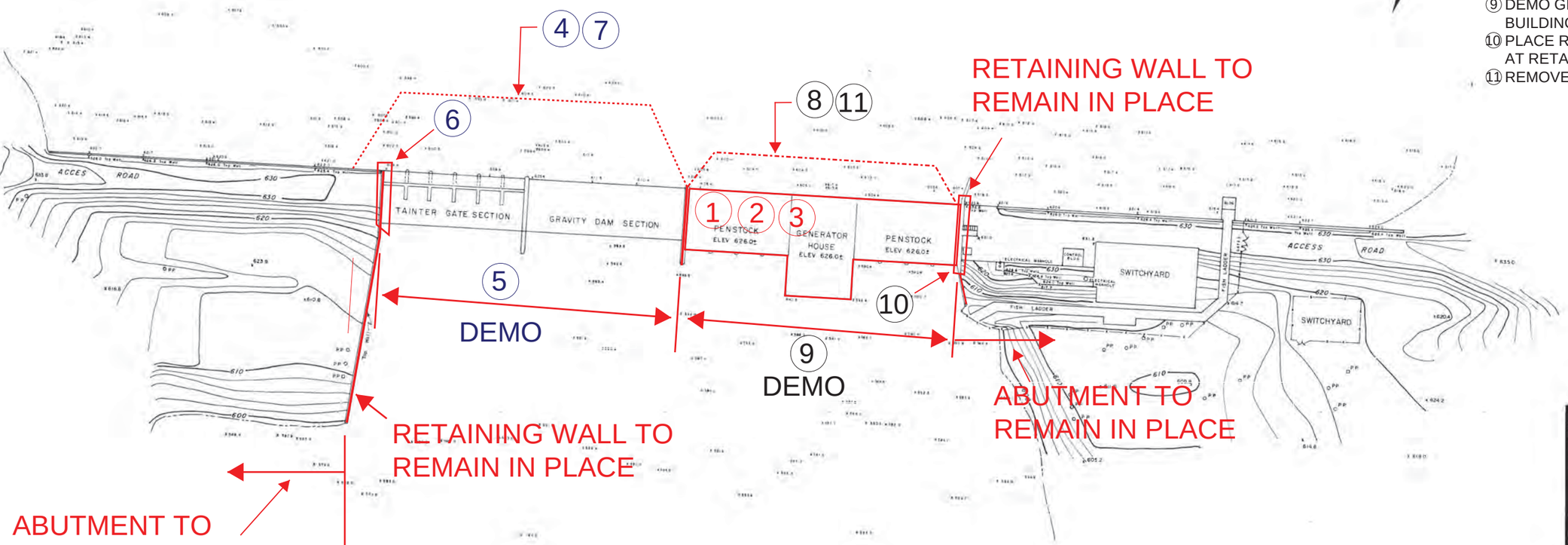
# BERRIEN SPRINGS HYDRO RETIREMENT
# DEMO SEQUENCE SKETCHES & CIVIL QUANTITIES
# BY: S&L

JANUARY 25, 2016
PAGE 3 OF 7

PHASE 1
① INSTALL STOPLOGS
② REMOVE EQUIPMENT
③ REMOVE STOPLOGS

PHASE 2
④ CONSTRUCT CAUSEWAY
⑤ DEMO TAINTER GATES & SPILLWAY SECTIONS
⑥ PLACE RIPRAP PROTECTION AT RETAINING WALL
⑦ REMOVE CAUSEWAY

PHASE 3
⑧ CONSTRUCT CAUSEWAY
⑨ DEMO GENERATION BUILDINGS
⑩ PLACE RIPRAP PROTECTION AT RETAINING WALL
⑪ REMOVE CAUSEWAY




## OPTION 3

PLAN
SCALE 1" = 40'

| DATE | NO. | DESCRIPTION | APPD. |
|---|---|---|---|
| 12/30/87 | 0 | ISSUED FOR CONSTRUCTION | MP |

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INDIANA MICHIGAN POWER COMPANY
BERRIEN SPRINGS HYDRO PLANT
BERRIEN SPRINGS MICHIGAN

EXITING TOPOGRAPHY

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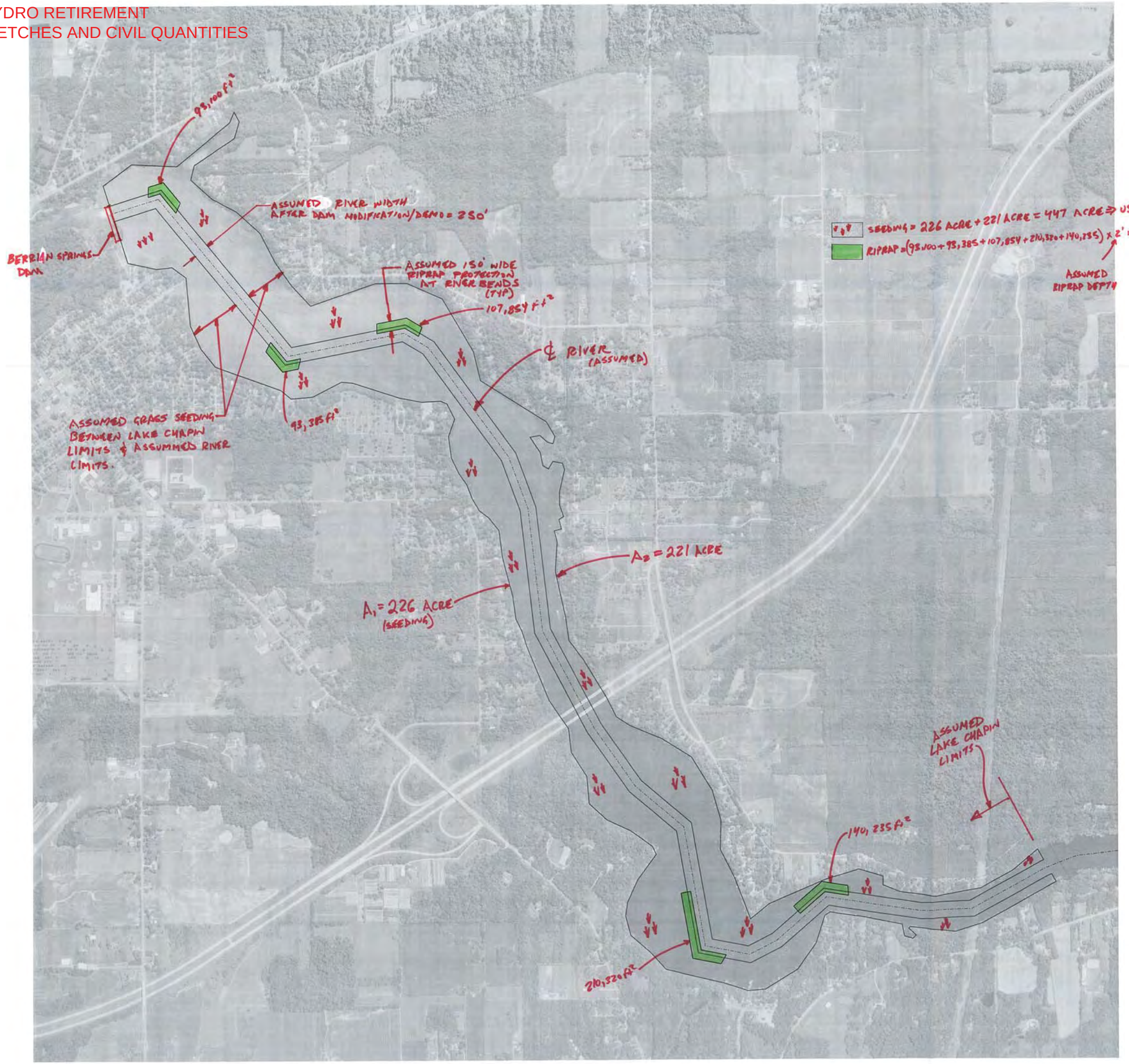
INDIANA MICHIGAN ELECTRIC COMPANY
BERRIEN SPRINGS HYDRO PLANT
EAST & WEST EMBANKMENT AREAS SHOWING TOPOGRAPHY - STRUCTURES - FEATURES
FIELD APPROVAL (ENGINEERING SECTION)
DESIGNER
A.E.P. CO.
DRAWN BY JCB DATE 6/23/87
CHECKED BY KLH DATE 6/25/87
SCALE 1" = 40'
083 870609
ENGINEERING DIVISION
DESIGN DIVISION
AMERICAN ELECTRIC POWER SERVICE CORP.

| BERRIAN SPRINGS | | | |
|---|---|---|---|
| OPTION 2 | | | |
| ITEM | QUANTITY | UNIT | REMARKS |
| GRASS SEEDING | 450 | ACRE | |
| RIPRAP PROTECTION | 47,770 | CY | 2 ft riprap protection @ D(50)=12" |
| RIVERBED EXCAVATION FOR RIPRAP | 100 | CY | TO BE REPLACED BY RIPRAP |
| RIPRAP PROTECTION AT SPILLWAY FLOOR SLAB | 100 | CY | 2 ft riprap protection @ D(50)=12" |

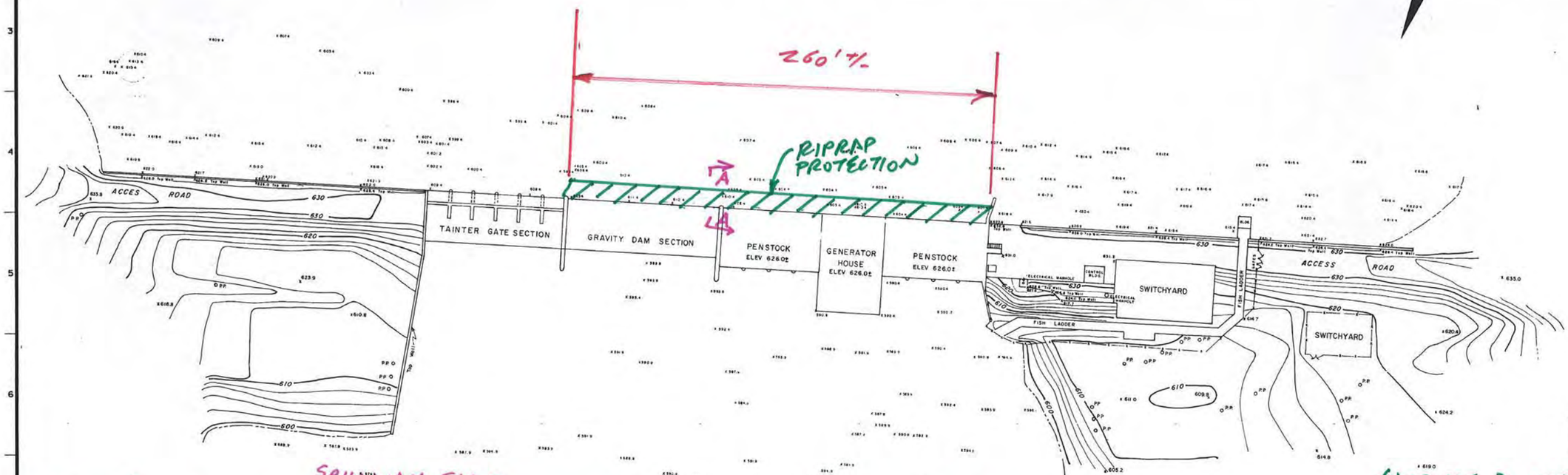
| OPTION 3 | | | |
|---|---|---|---|
| ITEM | QUANTITY | UNIT | REMARKS |
| GRASS SEEDING | 450 | ACRE | |
| RIPRAP PROTECTION | 47,770 | CY | 2 ft riprap protection @ D(50)=12" |
| RIVERBED EXCAVATION FOR RIPRAP | 140 | CY | TO BE REPLACED BY RIPRAP |
| RIPRAP PROTECTION AT RETAINING WALLS | 170 | CY | 2 ft riprap protection @ D(50)=12" |


93,100 ft²
ASSUMED RIVER WIDTH AFTER DAM MODIFICATION/DEMO = 250'
BERRIAN SPRINGS DAM
ASSUMED 150' WIDE RIPRAP PROTECTION AT RIVER BENDS (TYP)
107,854 ft²
℄ RIVER (ASSUMED)
ASSUMED GRASS SEEDING BETWEEN LAKE CHAPIN LIMITS & ASSUMMED RIVER LIMITS.
93,385 ft²
A₂ = 221 ACRE
A₁ = 226 ACRE (SEEDING)
ASSUMED LAKE CHAPIN LIMITS
140,235 ft²
210,320 ft²
SEEDING = 226 ACRE + 221 ACRE = 447 ACRE ⇒ USE 450 ACRE
RIPRAP = (93,100 + 93,385 + 107,854 + 210,320 + 140,235) x 2' x 1/27 = 47,770 CY
(ASSUME D50 = 12")
ASSUMED RIPRAP DEPTH
N
500' 0' 500' 1000'
GRAPHIC SCALE
BERRIAN SPRINGS
QUANTITIES
JAN/19/2016
BY: S&L

# I&M CONCEPTUAL DEMO ESTIMATE
# BERRIAN SPRINGS RETIREMENT OPTION 2
# CIVIL QUANTITIES

LAKE CHAPIN

POOL ELEVATION 624.4±




(ASSUME $D_{50}$=12")

$V_{RIPRAP} = (5' \times 2') \times 260' \times \frac{1}{27} = 96\ CY \approx 100\ CY$

$V_{EXC} = V_{RIPRAP} = 100\ CY$

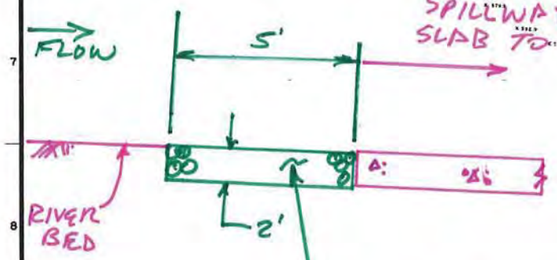
$V_{CUT}$ TO BE REPLACED BY RIPRAP

PLAN
SCALE 1" = 40'

ST. JOSEPH RIVER

WATER ELEVATION 598.9±

FLOW




SECTION A
N.T.S.

| DATE | NO. | DESCRIPTION | APPD. |
|---|---|---|---|
| 6/29/78 | | ISSUED FOR CONSTRUCTION | MB |

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INDIANA MICHIGAN POWER COMPANY

BERRIEN SPRINGS HYDRO PLANT

BERRIEN SPRINGS MICHIGAN

EXITING TOPOGRAPHY

DWG. NO. 14-30000-0

| ARCH. | ELEC. | MECH. | STR. |
|---|---|---|---|
| SCALED 1"=40' | | | |
| DR. J.B.T. | | | |
| CH. 7/17/78 | | | |
| SUB. CHK. | | | |
| DATED 2/20/79 | | | |

APPROVED BY: ENGINEERING DIVISION MB; DESIGN DIVISION

AMERICAN ELECTRIC POWER SERVICE CORP.
SURVEY AND MAPPING SECTION
INDIANA MICHIGAN ELECTRIC COMPANY
BERRIEN SPRINGS HYDRO PLANT
EAST & WEST EMBANKMENT AREAS SHOWING TOPOGRAPHY → STRUCTURES – FEATURES

FIELD APPROVAL (ENGINEERING SECTION)
DESIGNER
A.E.P. CO.

DRAWN BY JDB DATE 8/23/77
CHECKED BY PLH DATE 8/23/77
SHEET 1 OF 1
SCALE 1" = 40'

083 330/40 870609

AMERICAN ELECTRIC POWER SERVICE CORP.

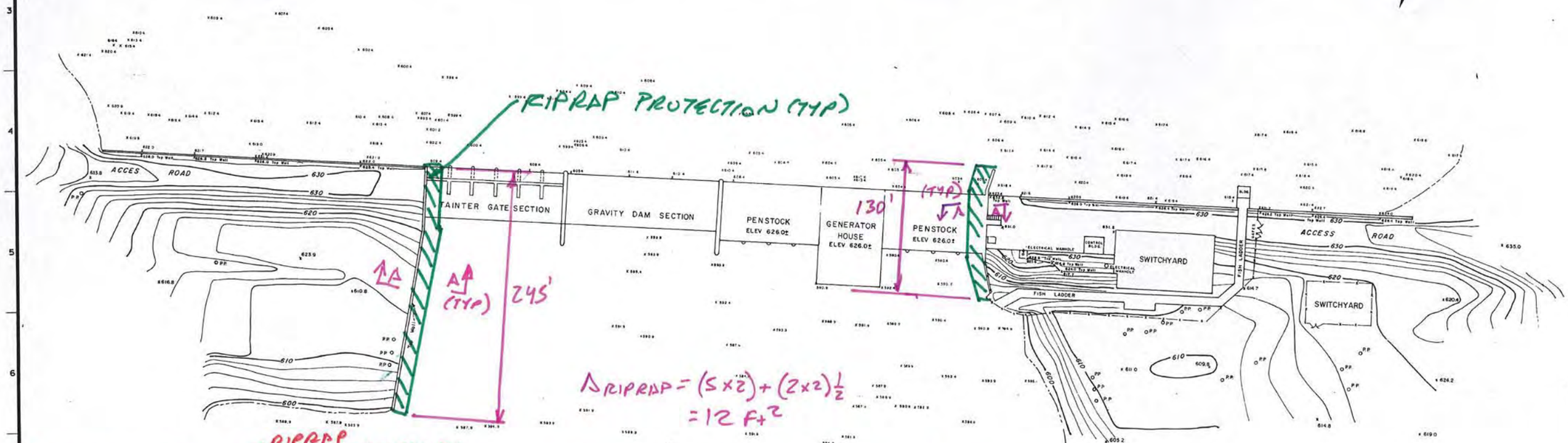
6788

DWG. NO. 14-30000

# I&M CONCEPTUAL DEMO ESTIMATE
# BERRIAN SPRINGS RETIREMENT OPTION 3
# CIVIL QUANTITIES

LAKE CHAPIN

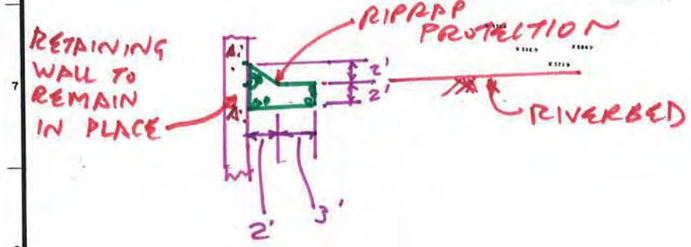
POOL ELEVATION 624.4±




$A_{RIPRAP} = (5 \times 2) + (2 \times 2)\frac{1}{2}$
$= 12\ Ft^2$

$V_{RIPRAP} = (12) \times (245+130)\left(\frac{1}{27}\right) = 170\ CY$

$V_{EXC} = (5 \times 2) \times (245+130)\left(\frac{1}{27}\right) = 140\ CY$




SECTION A
N.T.S.

PLAN
SCALE 1" = 40'

ST. JOSEPH RIVER
WATER ELEVATION 598.9±

FLOW

| DATE | NO. | DESCRIPTION | APPD. |
|---|---|---|---|
| 8/29/90 | | ISSUED FOR CONSTRUCTION | MD |

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INDIANA MICHIGAN POWER COMPANY
BERRIEN SPRINGS HYDRO PLANT
BERRIEN SPRINGS MICHIGAN

EXITING TOPOGRAPHY

DWG. NO. 14-30000-0

ARCH. | ELEC. | MECH. | STR.

SCALED 1"=40'
DR JST
CH MTP
SU. LDR
DATED 2/22/94
APPROVED BY: ENGINEERING SECTION MB Rebholz; DESIGN DIVISION

AMERICAN ELECTRIC POWER SERVICE CORP.
SURVEY AND MAPPING SECTION
INDIANA MICHIGAN ELECTRIC COMPANY
BERRIEN SPRINGS HYDRO PLANT
EAST & WEST EMBANKMENT AREAS SHOWING TOPOGRAPHY – STRUCTURES – FEATURES

FIELD APPROVAL (ENGINEERING SECTION)
DESIGNER
A.E.P. CO.
DRAWN BY JOB DATE 8/23/87
CHECKED BY KLH DATE 8/25/87
SHEET 1 OF 1
SCALE 1" = 40'

083 870609

AMERICAN ELECTRIC POWER SERVICE CORP.

6788

Buchanan Hydroelectric Plant

# CONCEPTUAL DEMOLITION COST ESTIMATE

Prepared for:
Indiana Michigan Power Company (Owner)
and American Electric Power Service Corporation

Project No. 13465-000
February 12, 2016
Revision 0

55 East Monroe Street
Chicago, IL 60603-5780 USA

# Issue Summary Page

| Revision Number | Date | Purpose | Prepared By | Reviewed By | Approved By | Pages Affected |
|---|---|---|---|---|---|---|
| A | 01/29/16 | Comments | R. C. Kinsinger | A.D. Chapin<br>D. F. Franczak | M. N. Ozan | All |
| 0 | 02/12/16 | Use | R. C. Kinsinger<br>RKinsinger<br>RC | A.D. Chapin<br>AChapin<br>D. F. Franczak<br>D.F. Franczak | T. J. Meehan | All |

## TABLE OF CONTENTS

## 1.0 INTRODUCTION

The Buchanan Hydroelectric Plant located in the City of Buchanan, Michigan is owned and operated by Indiana Michigan Power Company (I&M), a subsidiary of American Electric Power (AEP). The plant consists of (from left to right referenced facing downstream) a short left embankment section, a south abutment training wall, the spillway, the left headrace embankment (which includes the fish ladder), the powerhouse and the terminal headrace abutment. An access bridge spans the upstream end of the headrace and is not considered a water retaining structure. The powerhouse is located downstream of the spillway, at the downstream end of the headrace, and returns flow to the river in a cross channel direction. The powerhouse contains ten (10) operating Leffel Type Z and S turbine generators rated at 0.4 to 0.5 MW each, installed in 1996.

AEP recently contracted S&L to prepare conceptual demolition cost estimates considering three (3) retirement options defined as follows: (1) Option 1, Non-Power Operation, (2) Option 2, Partial Removal of the Dam Structures, and (3) Option 3, Complete Removal of the Dam and Powerhouse. Also, in addition S&L was requested to prepare a separate Asbestos Removal Conceptual Cost Estimate.

The objective of the conceptual demolition cost estimates is to determine the gross demolition costs for Buchanan Hydroelectric Plant (including gross salvage credits and any other benefits), in support of documenting a component of future AEP book depreciation rates to be approved by the I&M's state commissions and potential future inclusion in submittal of a rate case to the state commissions, and other potential uses. The cost estimate considers the demolition/dismantlement methodology which complies with current OSHA rules and regulations.

## 2.0 COST ESTIMATE SUMMARY

Conceptual Demolition Cost Estimate No. 33706B, dated February 12, 2016, was prepared and is included as Exhibit 2. This cost estimate was prepared for retirement option 3, but includes accounts allowing the determination of cost estimates for retirement options 1 and 2 as well. A summary of the conceptual demolition cost estimates for all three (3) retirement options is provided in Exhibit 1 and detailed in the following tables.

The cost estimate is structured into a code of accounts as identified in Table 2-1.

**Table 2-1**
**Cost Estimate Code of Accounts**

| Account Number | Description |
|---|---|
| 10, 21, 22 | Demolition Costs (including steel, equipment & piping scrap value) |
| 18 | Scrap Value Costs |
| 91 | Other Direct & Construction Indirect Costs |
| 93 | Indirect Costs |
| 94 | Contingency Costs |
| 96 | Escalation Costs |

The results of the cost estimate for retirement option 3 are provided in Table 2-2 below.

**Table 2-2**
**Cost Estimate Results Summary**
**Retirement Option 3**

| Description | Total Cost |
|---|---|
| Demolition Cost | $6,045,099 |
| Scrap Value | ($161,882) |
| Direct Cost Subtotal | $5,883,217 |
| Indirect Cost | $599,000 |
| Contingency Cost | $1,343,000 |
| Escalation Cost | $0 |
| Total Project Cost | $7,825,217 |

The results of the cost estimate for retirement option 1 are provided in Table 2-3 below.

**Table 2-3**
**Cost Estimate Results Summary**
**Retirement Option 1**

| Description | Total Cost |
|---|---|
| Demolition Cost | $149,377 |
| Scrap Value | ($80,344) |
| Direct Cost Subtotal | $69,033 |
| Indirect Cost | $7,000 |
| Contingency Cost | $42,600 |
| Escalation Cost | $0 |
| Total Project Cost | $118,633 |

The results of the cost estimate for retirement option 2 are provided in Table 2-4 below.

**Table 2-4**
**Cost Estimate Results Summary**
**Retirement Option 2**

| Description | Total Cost |
|---|---|
| Demolition Cost | $4,143,050 |
| Scrap Value | ($81,466) |
| Direct Cost Subtotal | $4,061,584 |
| Indirect Cost | $414,000 |
| Contingency Cost | $918,600 |
| Escalation Cost | $0 |
| Total Project Cost | $5,394,184 |

Asbestos Removal Conceptual Cost Estimate No. 33738B, dated February 12, 2016, was prepared and is included as Exhibit 3. The total estimated cost for asbestos removal prior to plant dismantlement is $55,200. Quantities were derived from drawings and past experience. Asbestos removal applies to the powerhouse, thus the removal cost applies to all three (3) retirement options. The cost of asbestos removal is excluded from the total conceptual demolition cost estimates for each retirement option detailed in the tables above.

## 3.0 TECHNICAL BASIS

The scope of dismantlement is based on three (3) retirement options, as requested by AEP, as follows:

Retirement Option 1, Non-Power Operation: This scenario would consider leaving intact all of the existing water-impounding structures and the powerhouse. Only the electric generating units and their auxiliary equipment would be removed so as to preclude the generation of electricity by the former hydroelectric plant. In addition, the spillway would be modified as required in order to pass river flows and maintain the impoundment's water surface elevation at the current conditions.

Retirement Option 2, Partial Removal of the Dam Structures: This scenario would consider demolition and removal of certain elements of the hydroelectric site in order to drain the existing impoundment and create a natural river channel through the dam site. This would generally include removal of the generating units and powerhouse and possibly but not inclusively demolition and removal of substantial portions of concrete spillway structures. This option would address the removal and stabilization of any sediments that have accumulated at the upstream end of the dam and the stabilization of the newly exposed reservoir/riverbanks.

Retirement Option 3, Complete Removal of the Dam and Powerhouse: This scenario would consider complete removal of the electric generating components and powerhouse and complete removal of the dam. Similar to option 2, this option would address the removal and stabilization of any sediments that have accumulated at the upstream end of the dam and the stabilization of the newly exposed reservoir/riverbanks.

The scope of dismantlement for each retirement option, as interpreted from the definitions above, are identified on marked plant drawings included as Exhibit 4. The scope of dismantlement and the sequence of demolition for each retirement option are defined on these sketches.

Retirement options 2 and 3 include the same demolition work as retirement option 1, removal of the generating unit components from the powerhouse. The powerhouse is not removed in retirement option 1, but is removed in retirement option 3. For retirement option 2 the powerhouse may or may not be removed, depending on if removal of portions of the dam can restore river flow to natural flow without removing the powerhouse (refer to Exhibit 4).

For each of the retirement options the scope of sediment removal is based on the quantity that would be disturbed from the demolition work itself and not complete removal of all sediment potentially disturbed by the partial or complete removal of the dam. The subcontractor costs included in retirement options 2 and 3 are for lime stabilization of the sediment and removal of the sediment and other wastes (such as timber) to the waste disposal site. These costs do not apply to retirement option 1 since only generating unit components in the powerhouse are removed and this material has scrap value.

Retirement options 2 and 3 include the stabilization of newly exposed riverbanks, which include the dam area and areas upstream of the dam. The extent of stabilization for retirement option 3 may be slightly more than retirement option 2, since the entire dam is being removed in retirement option 3.

The following are excluded from the scope of the conceptual demolition cost estimates:

- Asbestos removal (separate cost estimate prepared).
- The conceptual demolition cost estimate includes the cost to remove the one (1) main power transformer located in the switchyard, but not the cost to remove the switchyard itself (and remaining components in the switchyard).
- The existing fish ladder and access bridge will remain in place.
- Evaluation of the effect of the complete removal of the series of dams on the river watershed.
- Evaluation of the effect of the removal of any one dam, on either the upstream or downstream side dam and reservoir, after removal of the dam.
- Potential social or environmental impact of the draining of the reservoirs and the impact on property values or other community impact.
- The conceptual demolition cost estimate excludes any costs related to performing surveys to quantify the amount of sediment and chemical testing of the sediment. The quantity of sediment to be removed was estimated for retirement options 2 and 3 and the cost to remove the sediment is included in the conceptual demolition cost estimate. As stated above, the scope of sediment removal is based on the quantity that would be disturbed from the demolition work itself and not complete removal of the sediment potentially disturbed by the partial or complete removal of the dam.

The scope of the demolition cost estimate was reaffirmed during a review of the facility by two S&L employees in conjunction with a representative from Bradenburg Industrial Service Co. and AEP corporate and plant personnel. The facility review was held on Wednesday December 16, 2015.

## 4.0 COMMERCIAL BASIS

### 4.1 General Information

The Conceptual Demolition Cost Estimates prepared for the Buchanan Hydroelectric Plant is a conceptual estimate of the cost to dismantle the powerhouse and dam in accordance with the scope defined for each of the three (3) retirement options. Costs were calculated for (1) demolition of existing plant structures and equipment and associated site restoration costs, (2) scrap value of steel, copper and stainless steel, as applicable, (3) associated indirect costs, and (4) contingency.

All units used in the cost estimate are U.S. Standard and all costs are in US Dollars (4$^{th}$ Quarter 2015 levels). A three (3) year demolition schedule is anticipated for retirement option 3 including asbestos removal (to be performed prior to start of demolition work). The schedule takes into consideration environmental permitting, asbestos removal which includes mapping out all asbestos contamination throughout the powerhouse and associated abatement, followed by total plant demolition and site restoration. The schedule for the other two (2) retirement options would be correspondingly less.

### 4.2 Quantities/Material Cost

Quantities of pieces of equipment and/or bulk material commodities used in the cost estimates were intended to be reasonable and representative of projects of this type. Material quantities were estimated from the hydroelectric plant drawings and data provided by AEP, and the information obtained from Plant personnel during the facility review.

### 4.3 Construction Labor Wages

Craft labor rates (Craft Hourly Rate) for the cost estimate were calculated as Union Labor rates for South Bend, Indiana, based on 2015, R. S. Means “Labor Rates for the Construction Industry”. The craft rates were incorporated into work crews appropriate for the activities by adding allowances for small tools, construction equipment, insurance, and site overheads to arrive at crew hourly rates detailed in the cost estimate. A 1.10 regional labor productivity multiplier was included based on Compass International Global Construction Yearbook, 2015 Edition, for union work in Indiana. National Maintenance

Agreement Rates (typically negotiated by AEP) do not apply as this work is assumed to be performed as a lump sum contract.

### 4.3.1 Labor Work Schedule and Incentives

The estimate assumed a 5x8 work week. No per diem or other labor incentives are included.

### 4.3.2 Construction Indirects

Allowances were included in the cost estimate as direct costs as noted for the following:

- Freight: Material and scrap freight included in the material and scrap costs.
- Additional Crane Allowance: None included. Cost of cranes and construction machinery are included in the labor wage rates.
- Mobilization and Demobilization: Included in labor wage rates.
- Scaffolding: Included in labor wage rates.
- Consumables: Included in material and labor costs.
- Per Diem Costs: Excluded from the estimate.
- Contractor's General and Administrative Costs and Profit: Included in the labor wage rates.

## 4.4 Scrap Value

The value of scrap was determined by a 3 month average (November and December 2015 and January 2016) using Zone 4 (USA Midwest) of the "Scrap Metals Market Watch" (www.americanrecycler.com).

Since the values obtained are delivered pieces, 25% of the values obtained were deducted to pay for separation, preparation and shipping to the mills. This resulted in realized prices of:

- Mixed Steel Value @ $118/Ton
- Copper Value @ $3,180/Ton
- Stainless Steel @ $675/Ton

Note: 1 Ton = 2,000 Lbs

All steel is considered to be mixed steel unless otherwise noted.

## 4.5 Indirect Costs

Allowances were included in the cost estimate as indirect costs as noted for the following:

- Engineering, Procurement and Project Services: None included.
- Construction Management Support: None included.
- Owners Cost: Included as 10.0% of the total direct cost. Owners Costs include owner project engineering, administration and construction management, permits and fees, legal expenses, taxes, removal of chemicals, etc.

## 4.6 Escalation

No allowance for escalation was included in the cost estimate. All costs are determined in 4$^{th}$ Quarter 2015 levels.

## 4.7 Contingency

Allowances were included in the cost estimate as contingency as noted for the following:

- Scrap Value: Included as 15.0% reduction in the salvage value resulting in a total net reduction in the salvage value. The contingency assumes a potential drop in salvage value thus increasing the project cost. Scrap costs are very volatile but by taking a 3-month average some of the effect of volatility is reduced. However there are other variables that affect scrap pricing such as the quantity and processing fees. The contingency applied is based on the estimators confidence in scrap pricing used in the demolition cost estimate.
- Material: Included as 20.0% of the total material cost.
- Labor: Included as 20.0% of the total labor cost.
- Indirect: Included as 20.0% of the total indirect cost.
- Subcontractor: Included as 20.0% of the total subcontractor cost.

## 4.8 Assumptions

The following assumptions apply to the cost estimates.

- The cost estimate for each retirement option is based on the scope and the demolition sequences defined on the sketches provided in Exhibit 4.
- All chemicals will be removed by the Owner prior to demolition, from the facilities to be demolished.

- All electrical equipment and wiring is de-energized prior to start of dismantlement, except for that required for remote operation of the sluice and crest gates after demolition is completed for retirement option 1. There are two (2) sluice gates on the dam and three (3) hydraulically operated crest gates used to regulate the reservoir elevation.
- No extraordinary environmental costs for demolition have been included.
- Handling, on-site and off-site disposal of hazardous materials would be performed in compliance with methods approved by Owner.
- The window glazing in the powerhouse may be asbestos contaminated and an allowance for removal and disposal is included in the asbestos removal cost estimate. There are twenty (20) control boards mounted on 3' x 9' transite (asbestos) panels and an allowance for removal and disposal is included in the asbestos removal cost estimate. There is no building or pipe insulation in the facility and consequently no insulation related asbestos contamination.
- Switchyards within the plant boundaries are not part of the scope, neither are access roads to these facilities. Fences and gates needed to protect the switchyard will be left in place.
- All demolished materials are considered debris, except for organic combustibles and non-embedded metals which have scrap value.
- The basis for salvage estimating is for scrap value only. No resale of equipment or material is included.
- Sediment removed due to demolition work is treated with lime and hauled offsite to an approved waste disposal facility.

## 5.0 REFERENCES

**5.1** Buchanan Plant Drawings: One-Line Diagrams, No. 1-12001-0 and No. E-1000, Revision 8.

**5.2** Findlay Engineering, Inc., Supporting Technical Information Document, Buchanan Hydroelectric Project, August, 2005.

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# EXHIBIT 1
# Buchanan Hydroelectric Plant
# Conceptual Demolition Cost Estimate Summary

Buchanan Hydroelectric Plant
Indiana Michigan Power Company
American Electric Power Service Corporation
Estimate Number: 33706B



| | Retirement Option 1 | Retirement Option 2 | Retirement Option 3 |
|---|---|---|---|
| Demolition Cost | $ 149,377 | $ 4,143,050 | $ 6,045,099 |
| Scrap Value | $ (80,344) | $ (81,466) | $ (161,882) |
| Direct Cost Subtotal | $ 69,033 | $ 4,061,584 | $ 5,883,217 |
| Indirect Cost | $ 7,000 | $ 414,000 | $ 599,000 |
| Contingency Cost | $ 42,600 | $ 918,600 | $ 1,343,000 |
| Escalation Cost | $ - | $ - | $ - |
| Total Demolition Cost | $ 118,633 | $ 5,394,184 | $ 7,825,217 |

# EXHIBIT 2
# Buchanan Hydroelectric Plant
# Conceptual Demolition Cost Estimate No. 33706B

# AEP BUCHANAN
# HYDROELECTRIC PLANT DISMANTLEMENT STUDY
# CONCEPTUAL COST ESTIMATE

| | |
|---|---|
| **Client** | AEP |
| **Estimator** | RCK |
| **Labor rate table** | 15INSOU |
| **Project No.** | 13465-000 |
| **Station Name** | BUCHANAN |
| **Unit** | ALL |
| **Estimate Date** | 02/12/2016 |
| **Reviewed By** | ADC |
| **Approved By** | MNO |
| **Estimate No.** | 33706B |
| **Estimate Class** | Conceptual |
| **Cost index** | INSOU |

**AEP BUCHANAN**
**HYDROELECTRIC PLANT DISMANTLEMENT STUDY**
**CONCEPTUAL COST ESTIMATE**



| Area | Description | Subcontract Cost | Scrap Value | Material Cost | Man Hours | Labor Cost | Total Cost |
|---|---|---|---|---|---|---|---|
| ACCOUNT A | DEMOLITION ACCOUNT A | | (80,344) | 27,930 | 1,404 | 121,447 | 69,033 |
| ACCOUNT B | DEMOLITION ACCOUNT B | 865,700 | (1,122) | 1,830,118 | 17,340 | 1,297,855 | 3,992,551 |
| ACCOUNT C | DEMOLITION ACCOUNT C | 489,000 | (80,416) | (2,945) | 15,823 | 1,415,994 | 1,821,633 |
| | TOTAL DIRECT | 1,354,700 | (161,882) | 1,855,103 | 34,568 | 2,835,296 | 5,883,218 |

## Estimate Totals

| Description | Amount | Totals | Hours |
|---|---|---|---|
| **Direct Costs:** | | | |
| Labor | 2,835,296 | | 34,568 |
| Material | 1,855,103 | | |
| Subcontract | 1,354,700 | | |
| Scrap Value | (161,882) | | |
| | **5,883,217** | **5,883,217** | |
| **Other Direct & Construction Indirect Costs:** | | | |
| 91-1 Scaffolding | | | |
| 91-2 Cost Due To OT 5-10's | | | |
| 91-3 Cost Due To OT 6-10's | | | |
| 91-4 Per Diem | | | |
| 91-5 Consumables | | | |
| 91-8 Freight on Material | | | |
| 91-9 Freight on Process Equip | | | |
| 91-10 Sales Tax | | | |
| 91-11 Contractors G&A | | | |
| 91-12 Contractors Profit | | | |
| | | **5,883,217** | |
| **Indirect Costs:** | | | |
| 93-1 Engineering Services | | | |
| 93-2 CM Support | | | |
| 93-3 Start-Up/Commissioning | | | |
| 93-4 Start-Up/Spare Parts | | | |
| 93-5 Excess Liability Insur. | | | |
| 93-6 Sales Tax On Indirects | | | |
| 93-7 Owners Cost | 599,000 | | |
| 93-8 EPC Fee | | | |
| | **599,000** | **6,482,217** | |
| **Contingency:** | | | |
| 94-1 Contingency on Material | 371,000 | | |
| 94-2 Contingency on Labor | 557,000 | | |
| 94-3 Contingency on Sub. | 271,000 | | |
| 94-6 Contingency on Scrap | 24,000 | | |
| 94-5 Contingency on Indirect | 120,000 | | |
| | **1,343,000** | **7,825,217** | |
| **Escalation:** | | | |
| 96-1 Escalation on Const Equip | | | |
| 96-2 Escalation on Engr Equip | | | |
| 96-1 Escalation on Material | | | |
| 96-2 Escalation on Labor | | | |
| 96-3 Escalation on Subcontract | | | |
| 96-4 Escalation on Process Eq | | | |
| 96-5 Escalation on Indirects | | | |
| | | **7,825,217** | |
| | | **7,825,217** | |
| ***Total*** | | ***7,825,217*** | |

| Area | Group | Phase | Description | Notes | Quantity | Man Hours | Crew Rate | Labor Cost | Material Cost | Subcontract Cost | Scrap Value | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ACCOUNT A | | | DEMOLITION ACCOUNT A | | | | | | | | | |
| | 10.00.00 | | WHOLE PLANT DEMOLITION | | | | | | | | | |
| | | 10.31.00 | MECHANICAL EQUIPMENT | | | | | | | | | |
| | | | DEMO .6 MW GENERATOR | 10 GENERATORS AT 9500# EA | 47.50 TN | 470 | 85.53 /MH | 40,225 | | - | | 40,225 |
| | | | DEMO TURBINE AND GEARS | 10 GENERATORS AT 14000# EA | 70.00 TN | 693 | 85.53 /MH | 59,278 | | - | | 59,278 |
| | | | TURBINE ROOM 8.8 TON OVERHEAD CRANE | | 8.00 TN | 79 | 121.33 /MH | 9,610 | | - | | 9,610 |
| | | | MECHANICAL EQUIPMENT | | | 1,243 | | 109,113 | | | | 109,113 |
| | | | WHOLE PLANT DEMOLITION | | | 1,243 | | 109,113 | | | | 109,113 |
| | 18.00.00 | | SCRAP VALUE | | | | | | | | | |
| | | 18.10.00 | MIXED STEEL | | | | | | | | | |
| | | | MIXED STEEL | 10 - .4 & .5 MW GENERATOR, 10 @5,225# EA | -26.10 TN | | 79.62 /MH | | - | - | (3,082) | (3,082) |
| | | | MIXED STEEL | DEMO TURBINE AND GEARS | -70.00 TN | | 79.62 /MH | | - | - | (8,266) | (8,266) |
| | | | MIXED STEEL | TURBINE ROOM 8.8 TON OVERHEAD CRANE | -8.00 TN | | 79.62 /MH | | - | - | (945) | (945) |
| | | | MIXED STEEL | | | | | | | | (12,292) | (12,292) |
| | | 18.30.00 | COPPER | | | | | | | | | |
| | | | COPPER | 10 .4 &.5 MW GENERATOR 10@ 4,275 LB EA | -21.40 TN | | 79.62 /MH | | - | - | (68,052) | (68,052) |
| | | | COPPER | | | | | | | | (68,052) | (68,052) |
| | | | SCRAP VALUE | | | | | | | | (80,344) | (80,344) |
| | 22.00.00 | | CONCRETE | | | | | | | | | |
| | | 22.13.00 | Concrete | | | | | | | | | |
| | | | FLOWABLE FILL, 1500 PSI | FILL PENSTOCKS TO PREVENT BYPASS FLOW | 294.00 CY | 162 | 76.27 /MH | 12,334 | 27,930 | - | - | 40,264 |
| | | | Concrete | | | 162 | | 12,334 | 27,930 | | | 40,264 |
| | | | CONCRETE | | | 162 | | 12,334 | 27,930 | | | 40,264 |
| | | | ACCOUNT A DEMOLITION ACCOUNT A | | | 1,404 | | 121,447 | 27,930 | | (80,344) | 69,033 |
| ACCOUNT B | | | DEMOLITION ACCOUNT B | | | | | | | | | |
| | 10.00.00 | | WHOLE PLANT DEMOLITION | | | | | | | | | |
| | | 10.22.00 | CONCRETE | | | | | | | | | |
| | | | EQUIPMENT/ BUILDING FOUNDATION | SLUICE GATE CREST 16'X6'X7.7' | 27.00 CY | 33 | 89.94 /MH | 3,005 | | - | - | 3,005 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | RIGHT GATE CREST 137.85X6'X7.7' | 236.00 CY | 292 | 89.94 /MH | 26,270 | | - | - | 26,270 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | CENTER GATE APRON 127.9X6X3.5 | 99.00 CY | 123 | 89.94 /MH | 11,020 | | - | - | 11,020 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | LEFT GATE CREST 92.44X6'X7.7 | 158.00 CY | 196 | 89.94 /MH | 17,587 | | - | - | 17,587 |
| | | | CONCRETE | | | 644 | | 57,882 | | | | 57,882 |
| | | 10.23.00 | STEEL | | | | | | | | | |
| | | | STRUCTURAL AND GIRT STEEL | HEADRACE BRIDGE - LEFT IN PLACE | 0.00 TN | | 79.62 /MH | | | - | - | |
| | | 10.31.00 | MECHANICAL EQUIPMENT | | | | | | | | | |
| | | | 80 KW PROPANE ELECTRIC GENERATOR | | 1.50 TN | 3 | 121.33 /MH | 405 | | - | | 405 |
| | | | SLUICE GATES | 2 AT 4 TONS EACH | 8.00 TN | 18 | 121.33 /MH | 2,162 | | - | | 2,162 |
| | | | MECHANICAL EQUIPMENT | | | 21 | | 2,568 | | | | 2,568 |
| | | | WHOLE PLANT DEMOLITION | | | 665 | | 60,450 | | | | 60,450 |
| | 18.00.00 | | SCRAP VALUE | | | | | | | | | |
| | | 18.10.00 | MIXED STEEL | | | | | | | | | |
| | | | MIXED STEEL | 80 KW PROPANE ELECTRIC GENERATOR | -1.50 TN | | 79.62 /MH | | - | - | (177) | (177) |
| | | | MIXED STEEL | SLUICE GATES | -8.00 TN | | 79.62 /MH | | - | - | (945) | (945) |
| | | | MIXED STEEL | | | | | | | | (1,122) | (1,122) |
| | | | SCRAP VALUE | | | | | | | | (1,122) | (1,122) |
| | 21.00.00 | | CIVIL WORK | | | | | | | | | |
| | | 21.17.00 | Earthwork, Excavation | | | | | | | | | |
| | | | FOUNDATION EXCAVATION, CLAY USING 1 CY BACKHOE | RIVERBED EXCAVATION FOR RIPRAP | 152.00 CY | 28 | 88.08 /MH | 2,504 | | - | - | 2,504 |
| | | | Earthwork, Excavation | | | 28 | | 2,504 | | | | 2,504 |
| | | 21.41.00 | Erosion and Sedimentation Control | | | | | | | | | |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | FOR CAUSEWAYS | 5,156.00 CY | 1,684 | 74.10 /MH | 124,789 | 210,880 | - | - | 335,670 |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | RIPRAP PROTECTION | 38,100.00 CY | 12,444 | 74.10 /MH | 922,124 | 1,558,290 | - | - | 2,480,414 |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | CREDIT FOR REUSE OF CAUSEWAY STONE | -5,156.00 CY | | 74.10 /MH | | (210,880) | - | - | (210,880) |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | RIPRAP PROTECTION AT SPILLWAY FLOOR SLAB | 152.00 CY | 50 | 74.10 /MH | 3,679 | 6,217 | - | - | 9,896 |

| Area | Group | Phase | Description | Notes | Quantity | Man Hours | Crew Rate | Labor Cost | Material Cost | Subcontract Cost | Scrap Value | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Erosion and Sedimentation Control | | | 14,178 | | 1,050,593 | 1,564,507 | | | 2,615,099 |
| | | 21.47.00 | LANDSCAPING | | | | | | | | | |
| | | | HYDRO OR AIR SEED & MULCH & FERTILIZER | | 174.00 AC | 2,469 | 74.64 /MH | 184,309 | 265,611 | - | - | 449,920 |
| | | | LANDSCAPING | | | 2,469 | | 184,309 | 265,611 | | | 449,920 |
| | | 21.65.00 | Soil Remediation | | | | | | | | | |
| | | | REMOVAL OF LOCALIZED SILT AT DAM | LIME ADDITIVE FOR DRYING | 3,935.00 CY | | 196.64 /MH | | | 157,400 | - | 157,400 |
| | | | REMOVAL OF LOCALIZED SILT AT DAM | LOAD, MIX AND HAUL LIME AND SEDIMENT MIX (7870+3935) | 11,805.00 CY | | 196.64 /MH | | | 708,300 | - | 708,300 |
| | | | Soil Remediation | | | | | | | 865,700 | | 865,700 |
| | | | CIVIL WORK | | | 16,676 | | 1,237,405 | 1,830,118 | 865,700 | | 3,933,223 |
| | | | ACCOUNT B DEMOLITION ACCOUNT B | | | 17,340 | | 1,297,855 | 1,830,118 | 865,700 | (1,122) | 3,992,551 |
| ACCOUNT C | | | DEMOLITION ACCOUNT C | | | | | | | | | |
| | 10.00.00 | | WHOLE PLANT DEMOLITION | | | | | | | | | |
| | | 10.22.00 | CONCRETE | | | | | | | | | |
| | | | EQUIPMENT/ BUILDING FOUNDATION | SLUICE GATE APRON 16'X34'X6' | 121.00 CY | 150 | 89.94 /MH | 13,469 | | - | - | 13,469 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | SLUICE GATE THROAT 16'X34'X6' | 121.00 CY | 150 | 89.94 /MH | 13,469 | | - | - | 13,469 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | RIGHT GATE APRON 137.85X34'X6' | 1,042.00 CY | 1,290 | 89.94 /MH | 115,987 | | - | - | 115,987 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | RIGHT GATE THROAT 137.85X34'X6' | 1,042.00 CY | 1,290 | 89.94 /MH | 115,987 | | - | - | 115,987 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | 1 CENTER GATE APRON 127.9X30X4.5 | 640.00 CY | 792 | 89.94 /MH | 71,240 | | - | - | 71,240 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | 2 CENTER GATE APRON 127.9X30X4.5 | 640.00 CY | 792 | 89.94 /MH | 71,240 | | - | - | 71,240 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | CENTER GATE THROAT 127.9X40'X10' | 1,895.00 CY | 2,345 | 89.94 /MH | 210,936 | | - | - | 210,936 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | LEFT GATE APRON 92.44X34X6' | 698.00 CY | 864 | 89.94 /MH | 77,696 | | - | - | 77,696 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | LEFT GATE THROAT 92.44X34X6' | 698.00 CY | 864 | 89.94 /MH | 77,696 | | - | - | 77,696 |
| | | | GENERATOR HOUSE | | 2,890.00 CY | 3,577 | 89.94 /MH | 321,691 | | - | - | 321,691 |
| | | | CONCRETE | | | 12,113 | | 1,089,409 | | | | 1,089,409 |
| | | 10.23.00 | STEEL | | | | | | | | | |
| | | | STRUCTURAL AND GIRT STEEL | GENERATOR HOUSE | 221.00 TN | 247 | 79.62 /MH | 19,667 | | - | - | 19,667 |
| | | | STEEL | | | 247 | | 19,667 | | | | 19,667 |
| | | 10.24.00 | ARCHITECTURAL | | | | | | | | | |
| | | | GENERATOR HOUSE | 272.5'X30'X60'TALL | 490,500.00 CF | 2,104 | 89.81 /MH | 189,001 | | - | - | 189,001 |
| | | | ARCHITECTURAL | | | 2,104 | | 189,001 | | | | 189,001 |
| | | 10.31.00 | MECHANICAL EQUIPMENT | | | | | | | | | |
| | | | DEMO PENSTOCKS | 10 GENERATORS AT 11,800# EA | 59.00 TN | 584 | 85.53 /MH | 49,963 | | - | | 49,963 |
| | | | BAR RACKS | 10 AT 5 TONS EACH | 50.00 TN | 111 | 121.33 /MH | 13,514 | | - | | 13,514 |
| | | | STOP LOGS | 10 AT 5 TONS EACH | 50.00 TN | 111 | 121.33 /MH | 13,514 | | - | | 13,514 |
| | | | MECHANICAL EQUIPMENT | | | 807 | | 76,992 | | | | 76,992 |
| | | 10.41.00 | ELECTRICAL EQUIPMENT | | | | | | | | | |
| | | | GENERATOR BUS TRANSFORMERS | 2.4 to 34.5 KV, 2.67 MVA (STEEL) | 3.40 TN | 10 | 80.14 /MH | 801 | | - | - | 801 |
| | | | GENERATOR BUS TRANSFORMERS | 2.4 to 34.5 KV, 2.67 MVA (CU) | 1.85 TN | 5 | 80.14 /MH | 436 | | - | - | 436 |
| | | | MISCELLANEOUS ELECTRICAL EQUIPMENT | | 5.00 TN | 15 | 80.14 /MH | 1,178 | | - | - | 1,178 |
| | | | ELECTRICAL EQUIPMENT | | | 30 | | 2,415 | | | | 2,415 |
| | | 10.86.00 | WASTE | | | | | | | | | |
| | | | WASTE - USER DEFINED | MISC | 1.00 LS | 0 | 121.33 /MH | 13 | | - | 10,000 | 10,013 |
| | | | WASTE | | | 0 | | 13 | | | 10,000 | 10,013 |
| | | | WHOLE PLANT DEMOLITION | | | 15,301 | | 1,377,498 | | | 10,000 | 1,387,498 |
| | 18.00.00 | | SCRAP VALUE | | | | | | | | | |
| | | 18.10.00 | MIXED STEEL | | | | | | | | | |
| | | | MIXED STEEL | DEMO PENSTOCKS | -59.00 TN | | 79.62 /MH | | - | - | (6,967) | (6,967) |
| | | | MIXED STEEL | BAR RACKS | -50.00 TN | | 79.62 /MH | | - | - | (5,904) | (5,904) |
| | | | MIXED STEEL | STOP LOGS | -50.00 TN | | 79.62 /MH | | - | - | (5,904) | (5,904) |
| | | | MIXED STEEL | GENERATOR HOUSE | -122.60 TN | | 79.62 /MH | | - | - | (14,477) | (14,477) |
| | | | MIXED STEEL | GENERATOR BUS TRANSFORMERS | -3.40 TN | | 79.62 /MH | | - | - | (401) | (401) |
| | | | MIXED STEEL | | | | | | | | (33,653) | (33,653) |
| | | 18.30.00 | COPPER | | | | | | | | | |
| | | | COPPER | CABLE | -10.00 TN | | 79.62 /MH | | - | - | (31,800) | (31,800) |
| | | | COPPER | MISC. TRANSFORMERS & MOTORS UNIT 1 | -6.00 TN | | 79.62 /MH | | - | - | (19,080) | (19,080) |
| | | | COPPER | GENERATOR BUS TRANSFORMERS | -1.85 TN | | 79.62 /MH | | - | - | (5,883) | (5,883) |

| Area | Group | Phase | Description | Notes | Quantity | Man Hours | Crew Rate | Labor Cost | Material Cost | Subcontract Cost | Scrap Value | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | COPPER | | | | | | | | (56,763) | (56,763) |
| | | | SCRAP VALUE | | | | | | | | (90,416) | (90,416) |
| | 21.00.00 | | CIVIL WORK | | | | | | | | | |
| | | 21.17.00 | Earthwork, Excavation | | | | | | | | | |
| | | | FOUNDATION EXCAVATION, CLAY USING 1 CY BACKHOE | RIVERBED CREDIT EXCAVATION FOR RIPRAP (152-95) | -55.00 CY | -10 | 88.08 /MH | (906) | | - | - | (906) |
| | | | Earthwork, Excavation | | | -10 | | (906) | | | | (906) |
| | | 21.41.00 | Erosion and Sedimentation Control | | | | | | | | | |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | ADDITIONAL CAUSEWAY RIPRAP FOR PHASE 3 | 1,700.00 CY | 555 | 74.10 /MH | 41,145 | 69,530 | - | - | 110,675 |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | ADDITIONAL CREDIT FOR REUSE OF PHASE 3 CAUSEWAY STONE | -1,700.00 CY | | 74.10 /MH | | (69,530) | - | - | (69,530) |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | RIPRAP PROTECTION AT RETAINING WALLS - CREDIT (152-80) | -72.00 CY | -24 | 74.10 /MH | (1,743) | (2,945) | - | - | (4,687) |
| | | | Erosion and Sedimentation Control | | | 532 | | 39,402 | (2,945) | | | 36,457 |
| | | 21.65.00 | Soil Remediation | | | | | | | | | |
| | | | REMOVAL OF LOCALIZED SILT AT DAM | ADDITIONAL LIME ADDITIVE FOR DRYING PHASE 3 (6158-3935) | 2,223.00 CY | | 196.64 /MH | | | 88,920 | - | 88,920 |
| | | | REMOVAL OF LOCALIZED SILT AT DAM | ADDITIONAL LOAD, MIX AND HAUL LIME AND SEDIMENT MIX PHASE 3 (18473-11805) | 6,668.00 CY | | 196.64 /MH | | | 400,080 | - | 400,080 |
| | | | Soil Remediation | | | | | | | 489,000 | | 489,000 |
| | | | CIVIL WORK | | | 521 | | 38,496 | (2,945) | 489,000 | | 524,551 |
| | | | **ACCOUNT C DEMOLITION ACCOUNT C** | | | **15,823** | | **1,415,994** | **(2,945)** | **489,000** | **(80,416)** | **1,821,633** |

# EXHIBIT 3
# Buchanan Hydroelectric Plant
# Asbestos Removal Conceptual Cost Estimate No. 33738B

# AEP BUCHANAN
# HYDROELECTRIC PLANT DISMANTLEMENT STUDY - ASBESTOS REMOVAL
# CONCEPTUAL COST ESTIMATE

| | |
|---|---|
| **Client** | AEP |
| **Estimator** | RCK |
| **Labor rate table** | 15INSOU |
| **Project No.** | 13465-000 |
| **Station Name** | BUCHANAN |
| **Unit** | ALL |
| **Estimate Date** | 02/12/2016 |
| **Reviewed By** | ADC |
| **Approved By** | MNO |
| **Estimate No.** | 33738B |
| **Estimate Class** | Conceptual |
| **Cost index** | INSOU |

**AEP BUCHANAN**
**HYDROELECTRIC PLANT DISMANTLEMENT STUDY - ASBESTOS REMOVAL**
**CONCEPTUAL COST ESTIMATE**



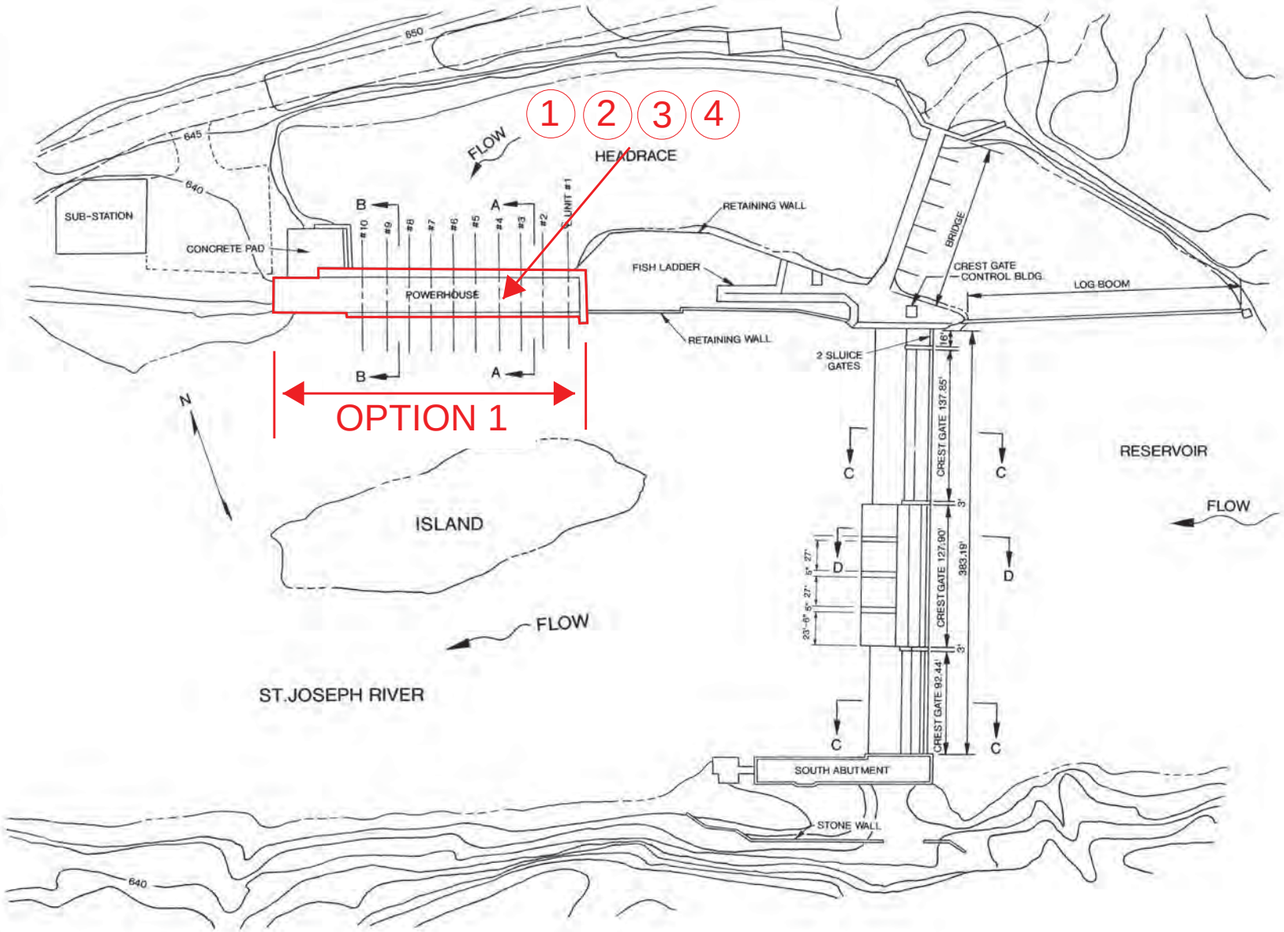
| Area | Description | Subcontract Cost | Scrap Value | Material Cost | Man Hours | Labor Cost | Total Cost |
|---|---|---|---|---|---|---|---|
| ASBESTOS | ASBESTOS REMOVAL | 41,800 | | | | | 41,800 |
| | TOTAL DIRECT | 41,800 | | | | | 41,800 |

## Estimate Totals

| Description | Amount | Totals | Hours |
|---|---|---|---|
| **Direct Costs:** | | | |
| Labor | | | |
| Material | | | |
| Subcontract | 41,800 | | |
| Scrap Value | | | |
| | **41,800** | **41,800** | |
| **Other Direct & Construction** | | | |
| **Indirect Costs:** | | | |
| 91-1 Scaffolding | | | |
| 91-2 Cost Due To OT 5-10's | | | |
| 91-3 Cost Due To OT 6-10's | | | |
| 91-4 Per Diem | | | |
| 91-5 Consumables | | | |
| 91-8 Freight on Material | | | |
| 91-9 Freight on Process Equip | | | |
| 91-10 Sales Tax | | | |
| 91-11 Contractors G&A | | | |
| 91-12 Contractors Profit | | | |
| | | **41,800** | |
| **Indirect Costs:** | | | |
| 93-1 Engineering Services | | | |
| 93-2 CM Support | | | |
| 93-3 Start-Up/Commissioning | | | |
| 93-4 Start-Up/Spare Parts | | | |
| 93-5 Excess Liability Insur. | | | |
| 93-6 Sales Tax On Indirects | | | |
| 93-7 Owners Cost | 4,200 | | |
| 93-8 EPC Fee | | | |
| | **4,200** | **46,000** | |
| **Contingency:** | | | |
| 94-1 Contingency on Material | | | |
| 94-2 Contingency on Labor | | | |
| 94-3 Contingency on Sub. | 8,400 | | |
| 94-6 Contingency on Scrap | | | |
| 94-5 Contingency on Indirect | 800 | | |
| | **9,200** | **55,200** | |
| **Escalation:** | | | |
| 96-1 Escalation on Const Equip | | | |
| 96-2 Escalation on Engr Equip | | | |
| 96-1 Escalation on Material | | | |
| 96-2 Escalation on Labor | | | |
| 96-3 Escalation on Subcontract | | | |
| 96-4 Escalation on Process Eq | | | |
| 96-5 Escalation on Indirects | | | |
| | | **55,200** | |
| | | **55,200** | |
| ***Total*** | | ***55,200*** | |

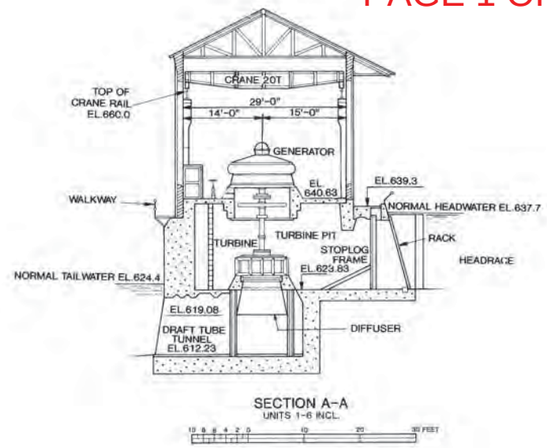
| Area | Group | Phase | Description | Notes | Quantity | Man Hours | Crew Rate | Labor Cost | Material Cost | Subcontract Cost | Scrap Value | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ASBESTOS** | | | **ASBESTOS REMOVAL** | | | | | | | | | |
| | **10.00.00** | | **WHOLE PLANT DEMOLITION** | | | | | | | | | |
| | | **10.37.00** | **ASBESTOS REMOVAL** | | | | | | | | | |
| | | | ASBESTOS REMOVAL - MISC MATERIALS | WINDOW CAULKING MISC MATERIALS | 2.00 CY | | 121.33 /MH | | | 3,800 | - | 3,800 |
| | | | ASBESTOS REMOVAL - CONTROL /INSTRUMENT PANELS | 20 PANELS 1X3X9' TALL | 20.00 CY | | 121.33 /MH | | | 38,000 | - | 38,000 |
| | | | **ASBESTOS REMOVAL** | | | | | | | **41,800** | | **41,800** |
| | | | **WHOLE PLANT DEMOLITION** | | | | | | | **41,800** | | **41,800** |
| | | | **ASBESTOS ASBESTOS REMOVAL** | | | | | | | **41,800** | | **41,800** |

# EXHIBIT 4
# Buchanan Hydroelectric Plant
# Retirement Option 1-3 Demolition Scope and Sequence

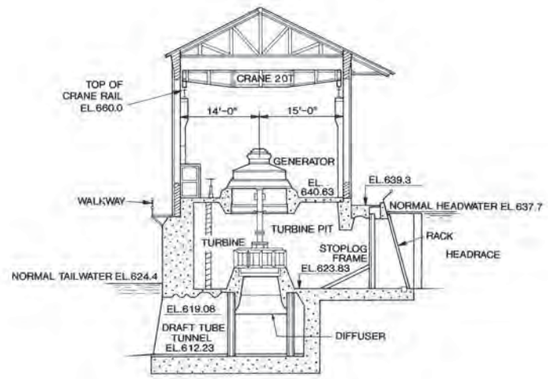



PLAN

0 50 100 150 200 FEET



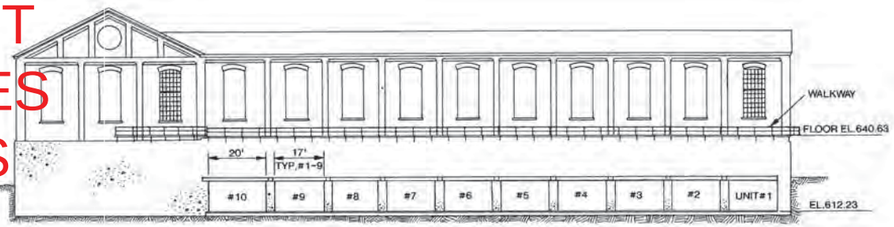

SECTION A-A
UNITS 1-6 INCL.




SECTION B-B
UNITS 7-10 INCL.

## OPTION 1

① INSTALL STOPLOGS
② REMOVE EQUIPMENT
③ GROUT DRAFT TUBES
④ REMOVE STOPLOGS




POWERHOUSE
SOUTH ELEVATION

0 20 40 60 80 100 FEET

THIS DRAWING, EXHIBIT"F",IS PART OF THE APPLICATION FOR LICENSE MADE BY INDIANA MICHIGAN POWER COMPANY.

BY _____

DATE 10/31/94

EXHIBIT F SHEET 1 OF 2

INDIANA MICHIGAN POWER COMPANY
**BUCHANAN**
**HYDROELECTRIC PROJECT NO. 2551**
**MICHIGAN**
PLAN, ELEVATIONS AND SECTIONS

FERC No. 2551-004-1

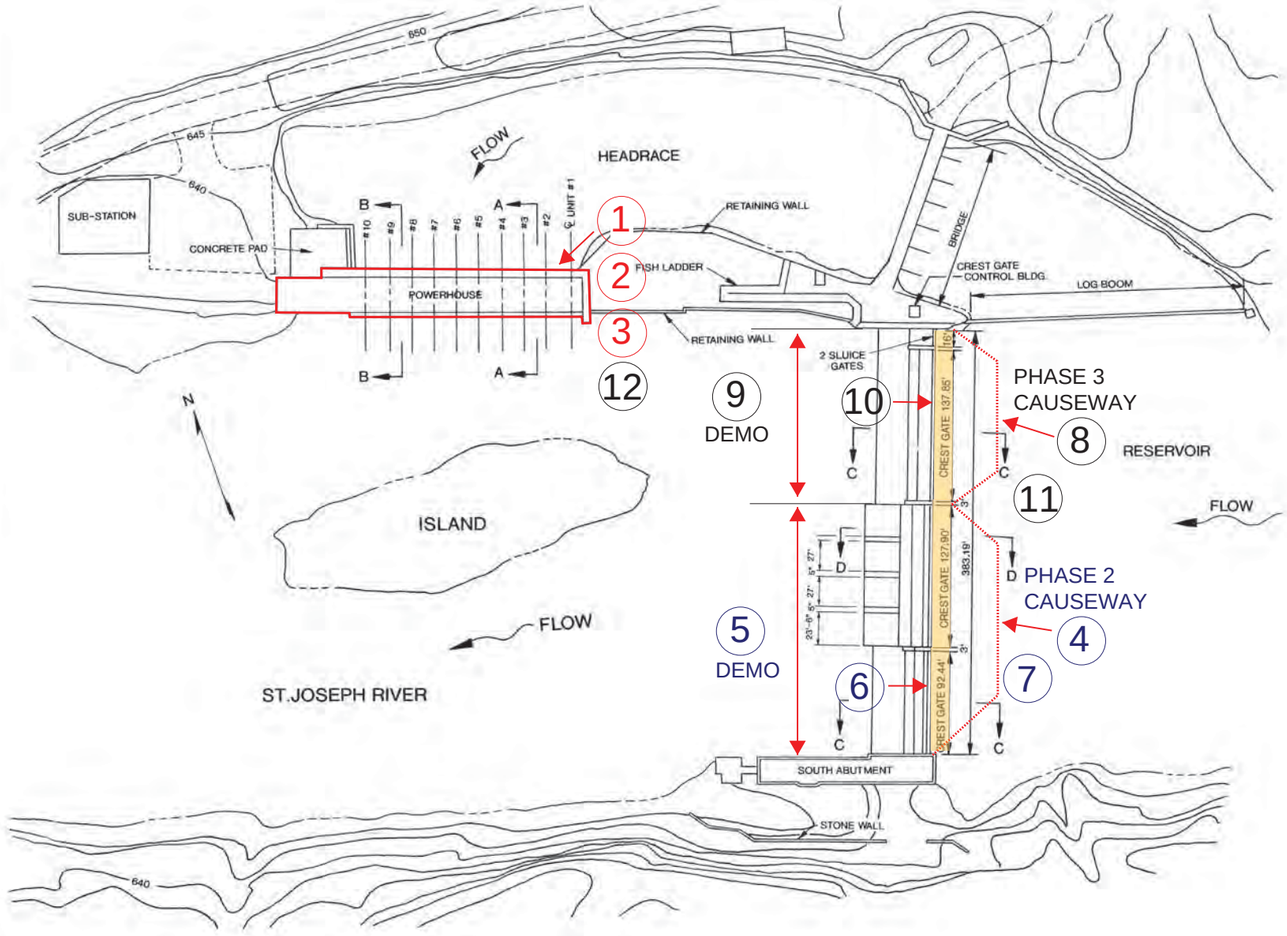
# BUCHANAN HYDRO RETIREMENT
# DEMO SEQUENCE SKETCHES & CIVIL QUANTITIES
# BY: S&L



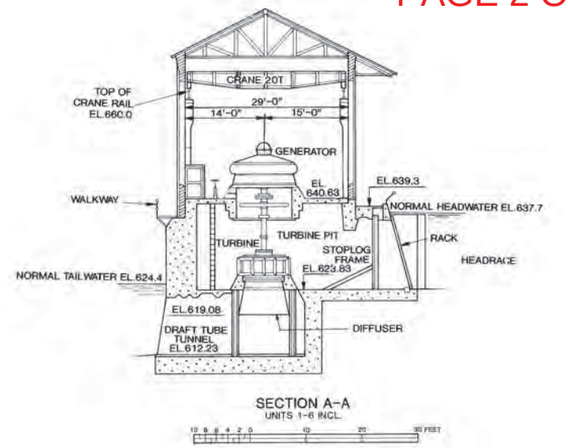
PHASE 1
① INSTALL STOPLOGS
② REMOVE EQUIPMENT
③ REMOVE STOPLOGS

PHASE 2
④ CONSTRUCT CAUSEWAY
⑤ DEMO SPILLWAY SECTIONS
⑥ PLACE RIPRAP PROTECTION
⑦ REMOVE CAUSEWAY

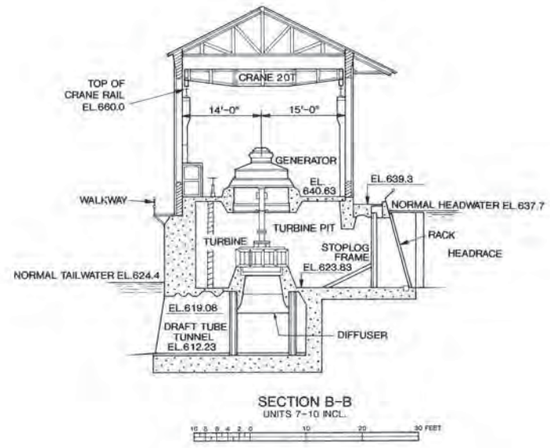
PHASE 3
⑧ CONSTRUCT CAUSEWAY
⑨ DEMO SPILLWAY
⑩ PLACE RIPRAP PROTECTION
⑪ REMOVE CAUSEWAY
⑫ GROUT DRAFT TUBE




PLAN
0 50 100 150 200 FEET

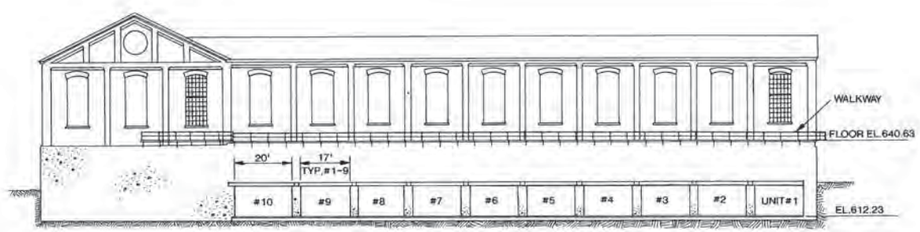



SECTION A–A
UNITS 1–6 INCL.




SECTION B–B
UNITS 7–10 INCL.

OPTION 2




POWERHOUSE
SOUTH ELEVATION
0 20 40 60 80 100 FEET

THIS DRAWING, EXHIBIT"F",IS PART OF THE APPLICATION FOR LICENSE MADE BY INDIANA MICHIGAN POWER COMPANY.
BY _____
DATE 10/31/91

EXHIBIT F SHEET 1 OF 2

INDIANA MICHIGAN POWER COMPANY
**BUCHANAN**
**HYDROELECTRIC PROJECT NO. 2551**
**MICHIGAN**
PLAN, ELEVATIONS AND SECTIONS

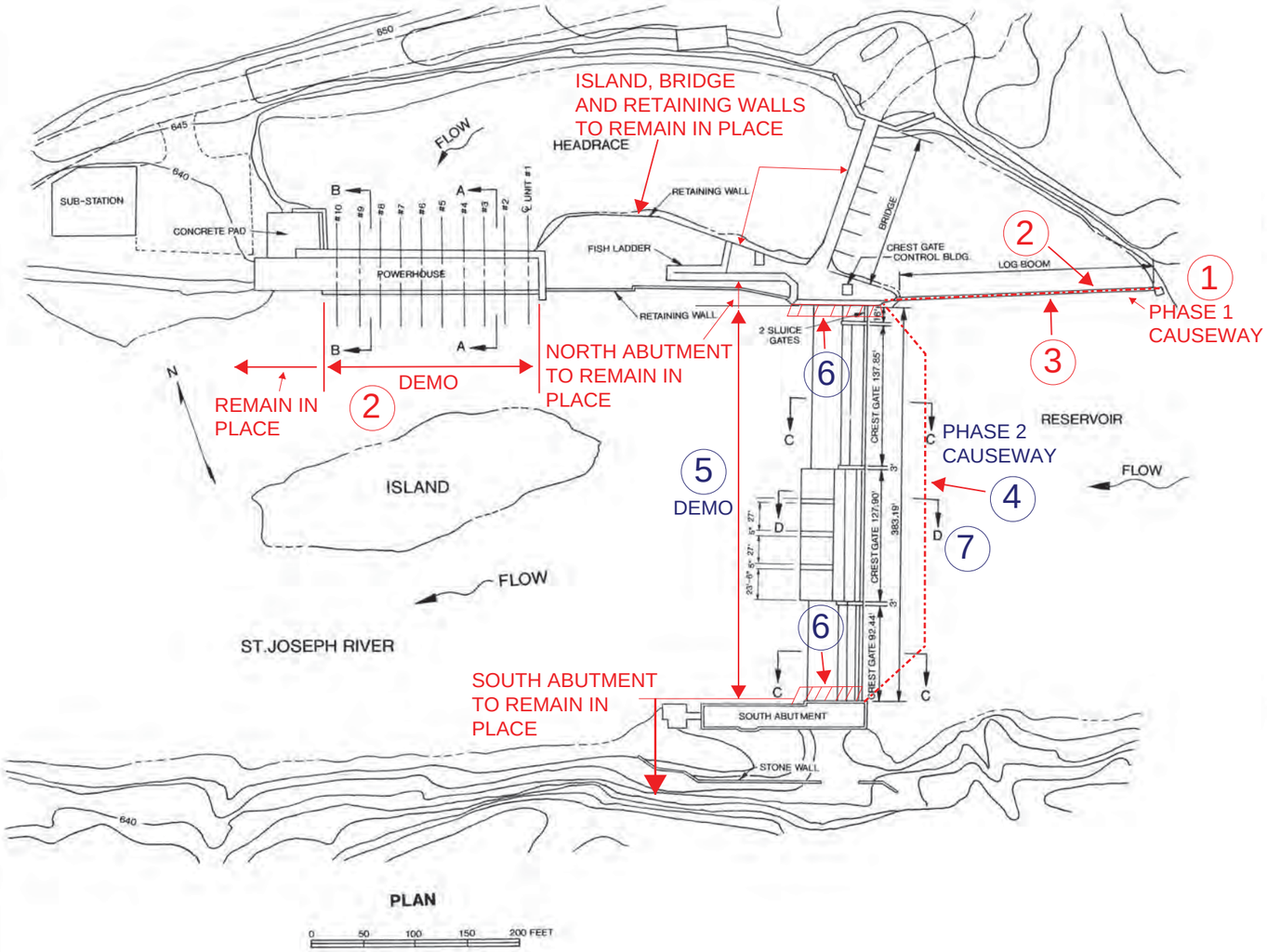
FERC No. 2551–004–1

# BUCHANAN HYDRO RETIREMENT
# DEMO SEQUENCE SKETCHES & CIVIL QUANTITIES
BY: S&L

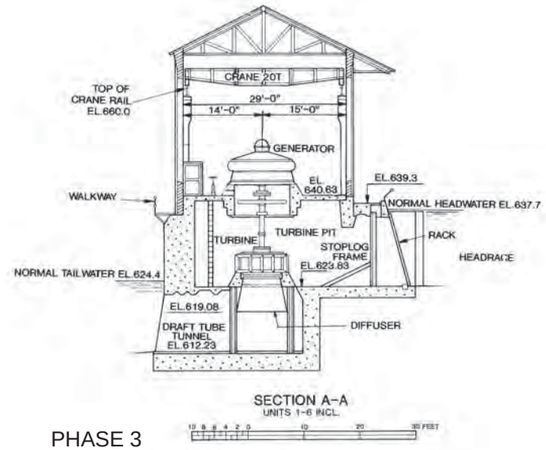


PHASE 1
① CONSTRUCT CAUSEWAY
② DEMO POWERHOUSE AND LOG BOOM
③ REMOVE CAUSEWAY

PHASE 2
④ CONSTRUCT CAUSEWAY
⑤ DEMO SPILLWAY SECTIONS
⑥ PLACE RIPRAP PROTECTION AT ABUTMENTS
⑦ REMOVE CAUSEWAY



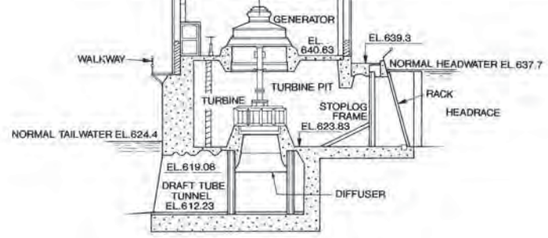

PLAN
0 50 100 150 200 FEET




SECTION A-A
UNITS 1-6 INCL.

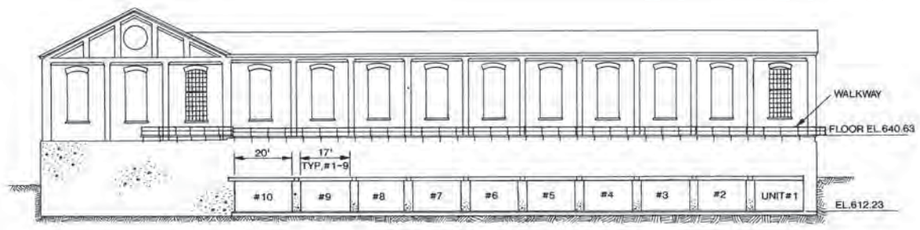
PHASE 3 CAUSEWAY

8
11




SECTION B-B
UNITS 7-10 INCL.

## OPTION 3




POWERHOUSE
SOUTH ELEVATION
0 20 40 60 80 100 FEET

THIS DRAWING, EXHIBIT"F",IS PART OF THE APPLICATION FOR LICENSE MADE BY INDIANA MICHIGAN POWER COMPANY.
BY _____
DATE 10/31/91

EXHIBIT F SHEET 1 OF 2

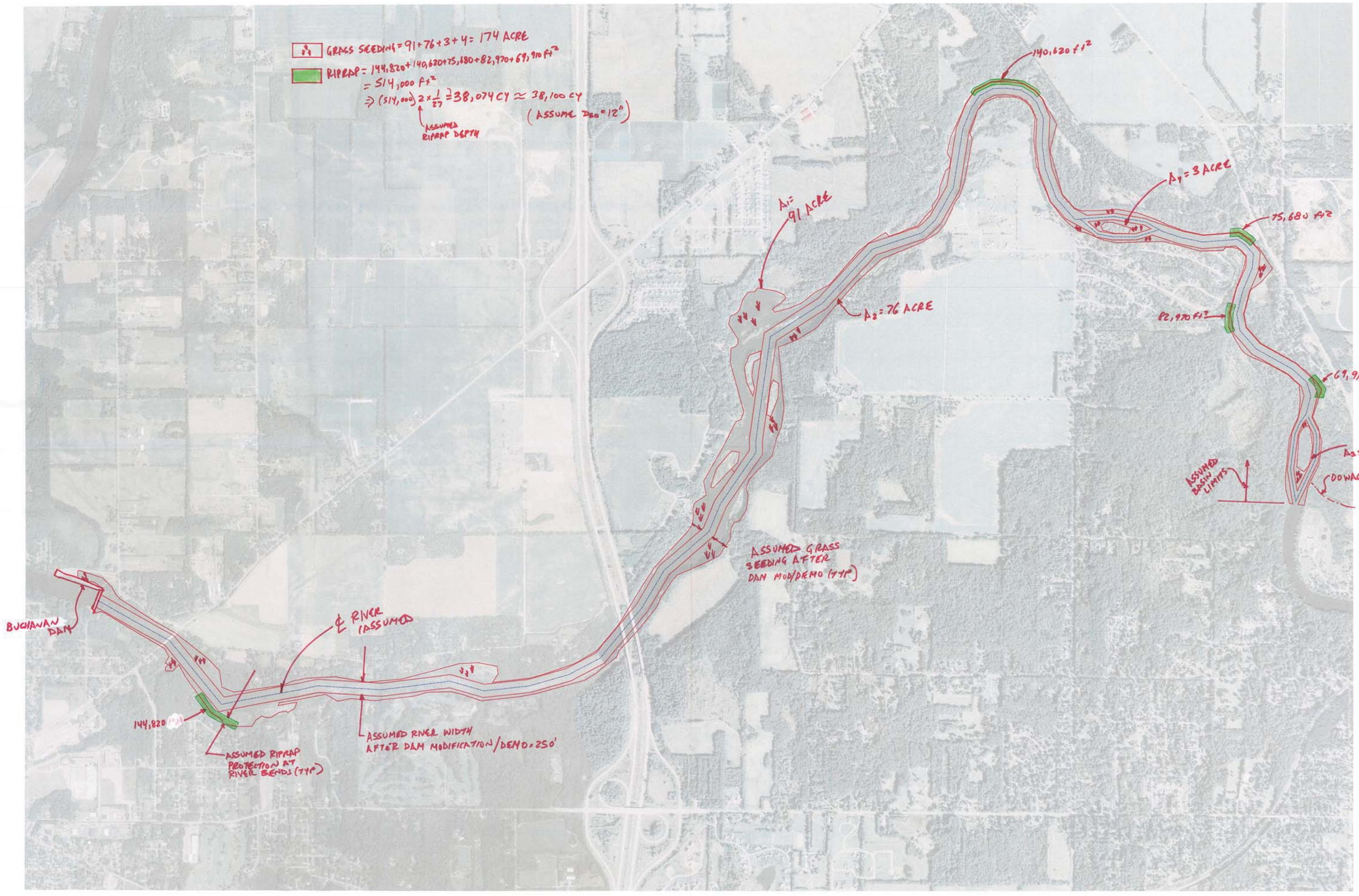
INDIANA MICHIGAN POWER COMPANY
**BUCHANAN**
**HYDROELECTRIC PROJECT NO. 2551**
**MICHIGAN**
PLAN, ELEVATIONS AND SECTIONS

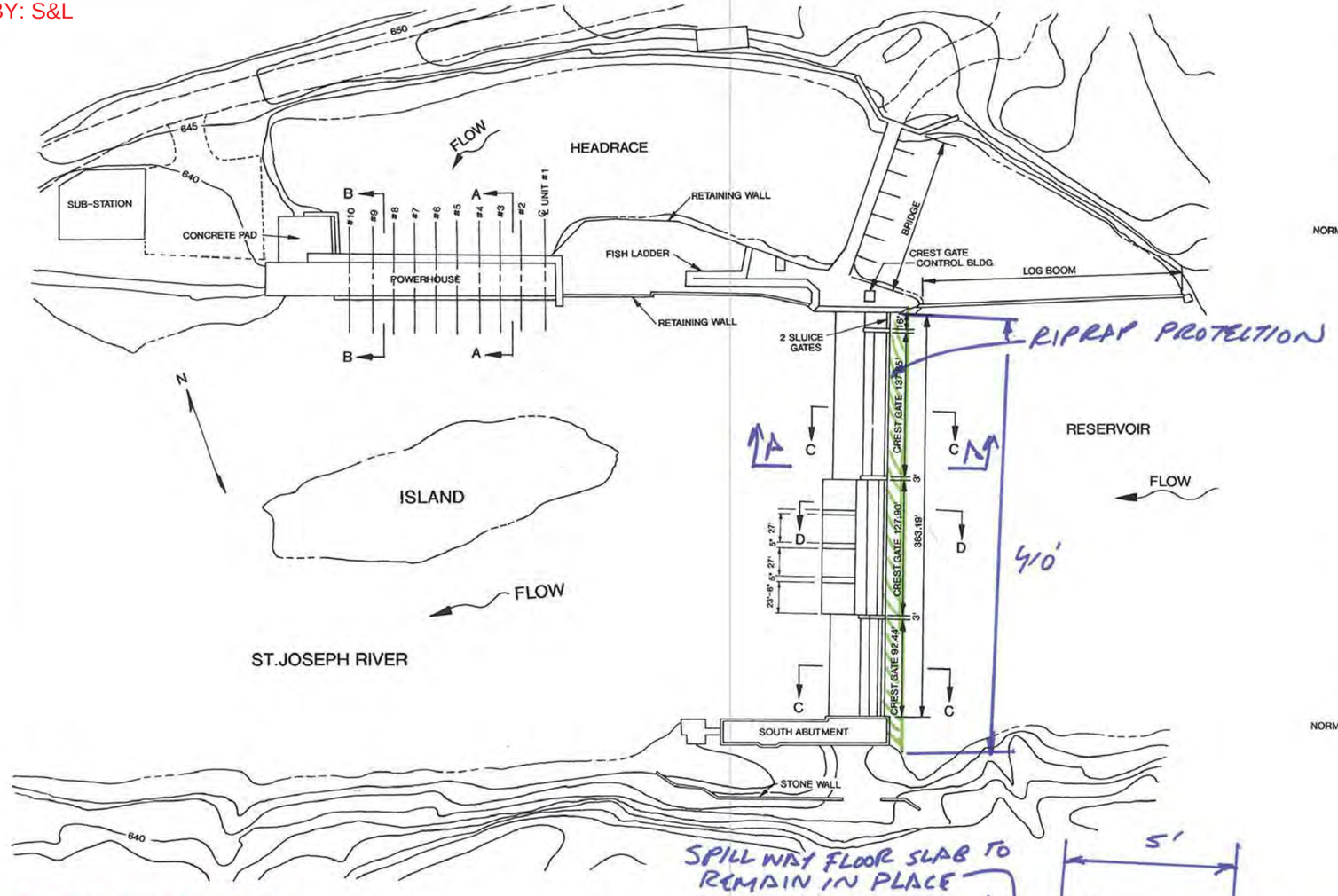
FERC No. 2551-004-1

| BUCHANAN | | | |
|---|---|---|---|
| OPTION 2 | | | |
| ITEM | QUANTITY | UNIT | REMARKS |
| GRASS SEEDING | 174 | ACRE | |
| RIPRAP PROTECTION | 38,100 | CY | 2 ft riprap protection @ D(50)=12" |
| RIVERBED EXCAVATION FOR RIPRAP | 152 | CY | TO BE REPLACED BY RIPRAP |
| RIPRAP PROTECTION AT SPILLWAY FLOOR SLAB | 152 | CY | 2 ft riprap protection @ D(50)=12" |

| OPTION 3 | | | |
|---|---|---|---|
| ITEM | QUANTITY | UNIT | REMARKS |
| GRASS SEEDING | 174 | ACRE | |
| RIPRAP PROTECTION | 38,100 | CY | 2 ft riprap protection @ D(50)=12" |
| ~~BASIN FILL~~ | ~~86,100~~ | ~~CY~~ | |
| ~~RIPRAP PROTECTION FOR CONCRETE REMOVAL~~ | ~~4,180~~ | ~~CY~~ | ~~2 ft riprap protection @ D(50)=12"~~ |
| RIVERBED EXCAVATION FOR RIPRAP | 95 | CY | TO BE REPLACED BY RIPRAP |
| RIPRAP PROTECTION AT RETAINING WALLS | 80 | CY | 2 ft riprap protection @ D(50)=12" |

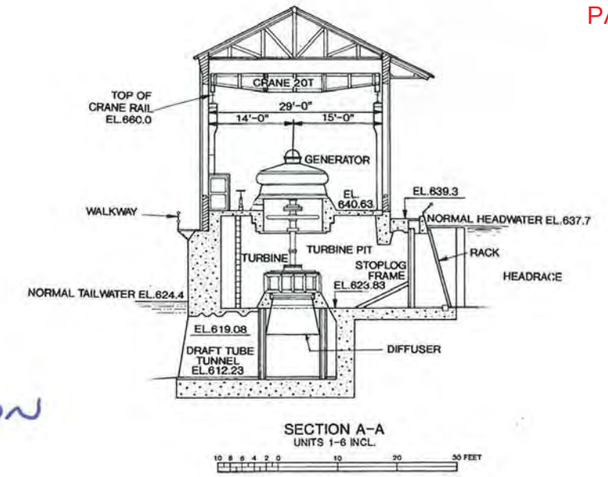
Indiana Michigan Power Company
Attachment JAC-3
Witness: Cash
Page 66 of 205





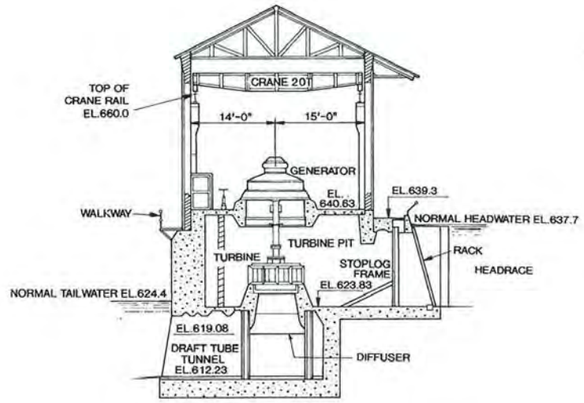

PLAN

0 50 100 150 200 FEET




SECTION A–A
UNITS 1–6 INCL.

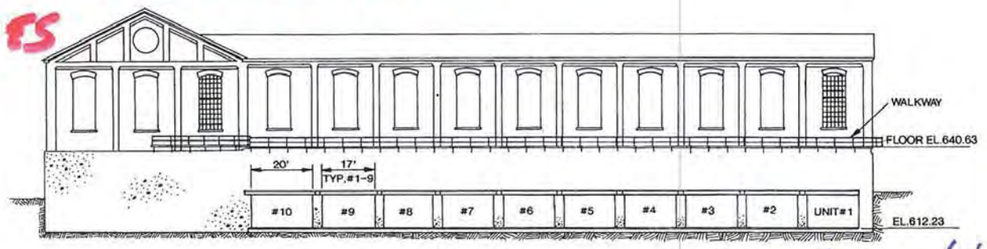
10 8 6 4 2 0 10 20 30 FEET




SECTION B–B
UNITS 7–10 INCL.

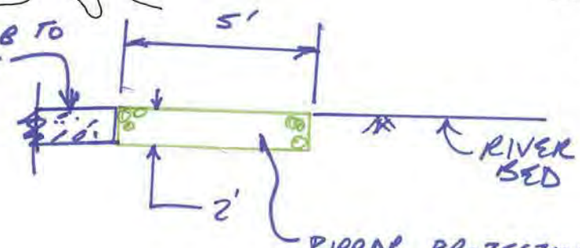
10 8 6 4 2 0 10 20 30 FEET

I&M CONCEPTUAL DEMO ESTIMATE
BUCHANAN RETIREMENT OPTION 2
CIVIL QUANTITIES




POWERHOUSE
SOUTH ELEVATION

0 20 40 60 80 100 FEET




SECTION A
N.T.S.

$V_{RIPRAP} = (5' \times 2')(410')(\frac{1}{27}) = 152\ CY$

$V_{CUT} = V_{RIPRAP} = 152\ CY$

EXHIBIT F SHEET 1 OF 2

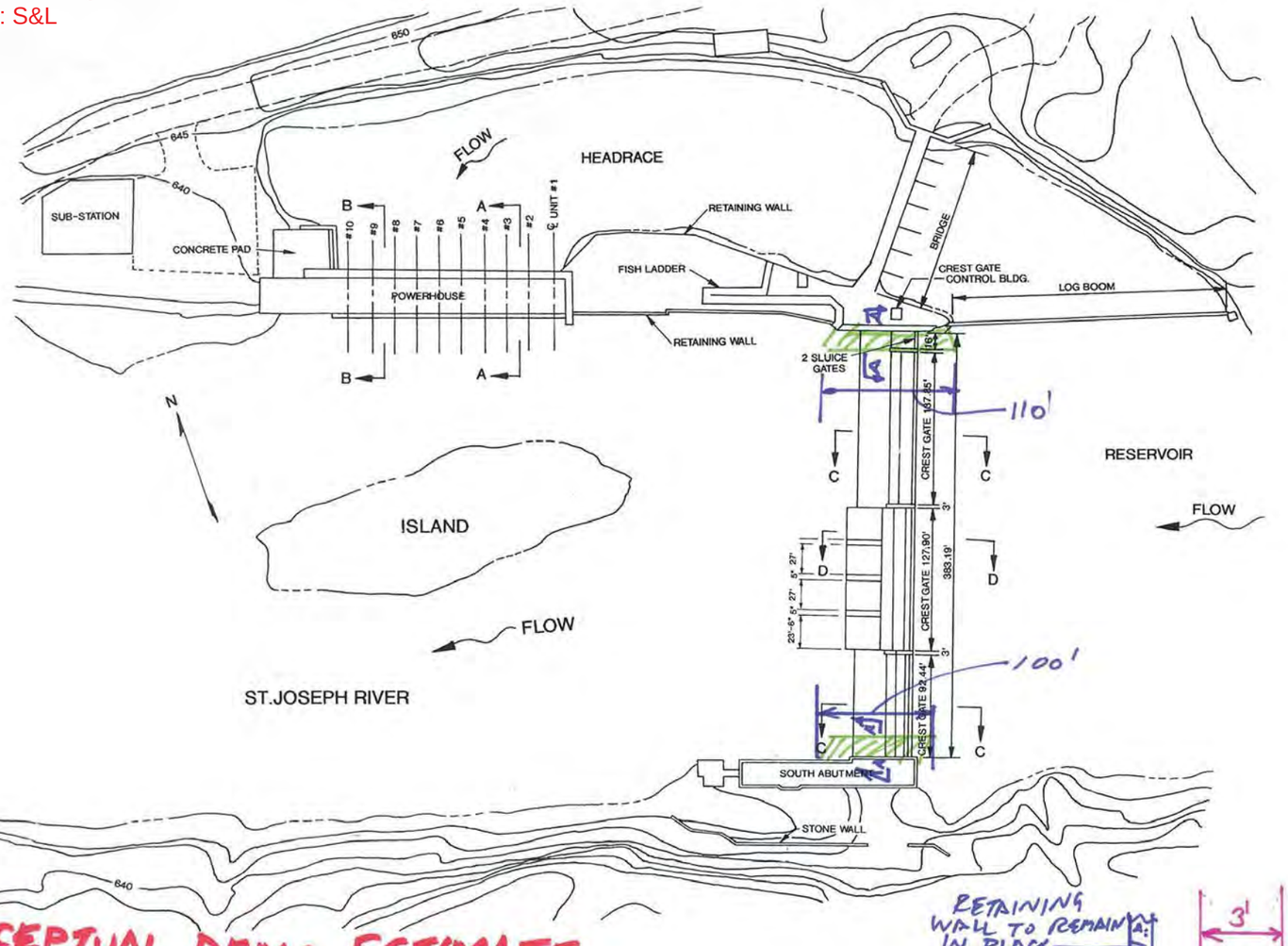
INDIANA MICHIGAN POWER COMPANY
**BUCHANAN**
**HYDROELECTRIC PROJECT NO. 2551**
**MICHIGAN**
PLAN, ELEVATIONS AND SECTIONS

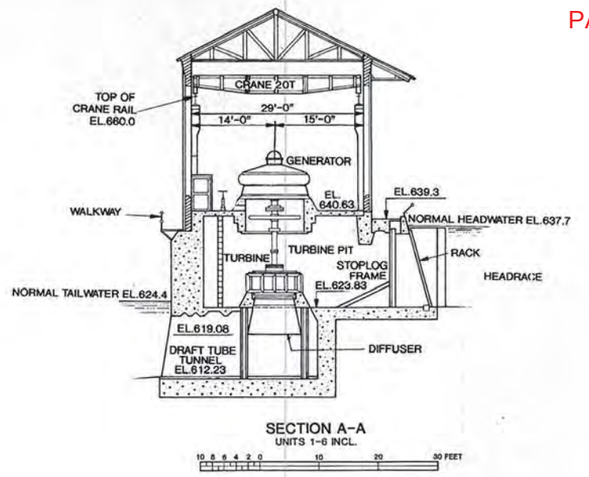
THIS DRAWING, EXHIBIT "F", IS PART OF THE APPLICATION FOR LICENSE MADE BY INDIANA MICHIGAN POWER COMPANY.

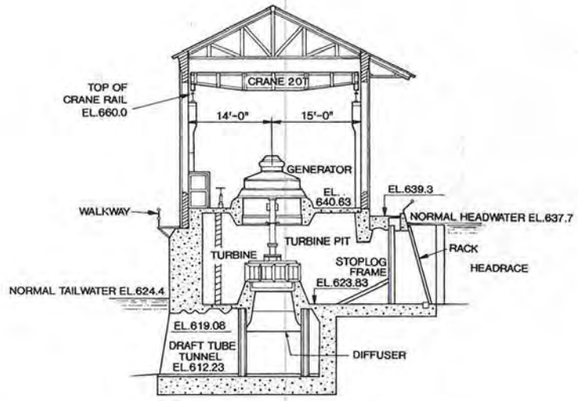
BY _____

DATE 10/31/91

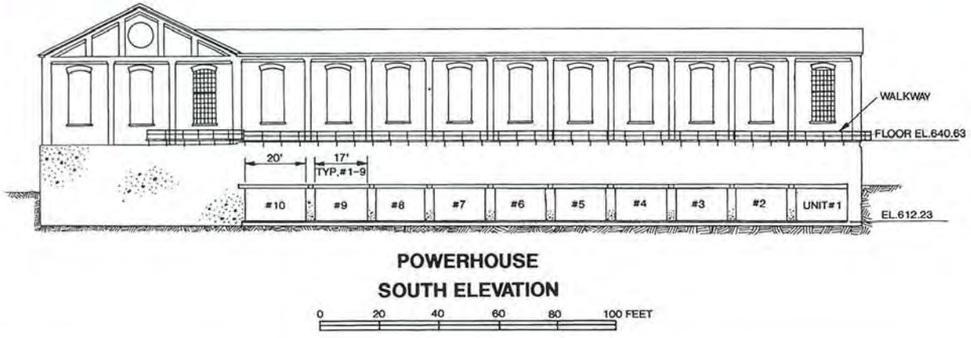
FERC No. 2551–004–1

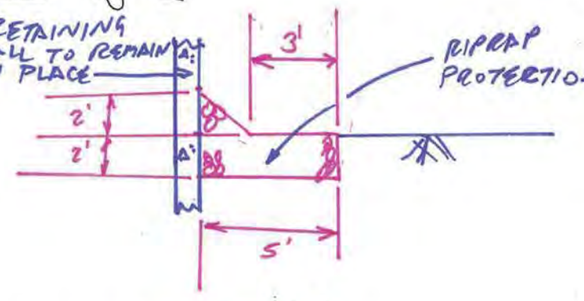



I&M CONCEPTUAL DEMO ESTIMATE
BUCHANAN RETIREMENT OPTION 3
CIVIL QUANTITIES




$V_{RIPRAP} = (124\,ft^2)(110+100)\times\frac{1}{27} = 95\ cy$

$V_{OUT} = (10\,ft^2)(110+100)\times\frac{1}{27} = 80\ cy$

THIS DRAWING, EXHIBIT"F",IS PART OF THE APPLICATION FOR LICENSE MADE BY INDIANA MICHIGAN POWER COMPANY.
BY _____
DATE 10/31/91

EXHIBIT F SHEET 1 OF 2

INDIANA MICHIGAN POWER COMPANY
**BUCHANAN**
**HYDROELECTRIC PROJECT NO.2551**
**MICHIGAN**
PLAN, ELEVATIONS AND SECTIONS

Constantine Hydroelectric Plant

# CONCEPTUAL DEMOLITION COST ESTIMATE

Prepared for:
Indiana Michigan Power Company (Owner)
and American Electric Power Service Corporation

Project No. 13465-000
February 12, 2016
Revision 0

55 East Monroe Street
Chicago, IL 60603-5780 USA

# Issue Summary Page

| Revision Number | Date | Purpose | Prepared By | Reviewed By | Approved By | Pages Affected |
|---|---|---|---|---|---|---|
| A | 01/29/16 | Comments | R. C. Kinsinger | A.D. Chapin<br>D. F. Franczak | M. N. Ozan | All |
| 0 | 02/12/16 | Use | R. C. Kinsinger<br>RKinsinger<br>RC | A.D. Chapin<br>AChapin<br>D. F. Franczak<br>D. F. Franczak | T. J. Meehan | All |

## TABLE OF CONTENTS

## 1.0 INTRODUCTION

The Constantine Hydroelectric Plant located in the City of Constantine, Michigan is owned and operated by Indiana Michigan Power Company (I&M), a subsidiary of American Electric Power (AEP). The plant consists of (from left to right referenced facing downstream) a left abutment embankment section, a flashboard regulated spillway, a canal headgate structure, a power canal (headrace) flanked by earth embankments on either side of the canal, the powerhouse and a separate saddle dike on the left bank of the power canal. The powerhouse is located downstream of the spillway, at the downstream end of the headrace, and returns flow to the river. The powerhouse contains four (4) operating S. Morgan Francis turbine generators rated at 0.3 MW each, installed in 1923 or 1924.

AEP recently contracted S&L to prepare conceptual demolition cost estimates considering three (3) retirement options defined as follows: (1) Option 1, Non-Power Operation, (2) Option 2, Partial Removal of the Dam Structures, and (3) Option 3, Complete Removal of the Dam and Powerhouse. Also, in addition S&L was requested to prepare a separate Asbestos Removal Conceptual Cost Estimate.

The objective of the conceptual demolition cost estimates is to determine the gross demolition costs for Constantine Hydroelectric Plant (including gross salvage credits and any other benefits), in support of documenting a component of future AEP book depreciation rates to be approved by the I&M's state commissions and potential future inclusion in submittal of a rate case to the state commissions, and other potential uses. The cost estimate considers the demolition/dismantlement methodology which complies with current OSHA rules and regulations.

## 2.0 COST ESTIMATE SUMMARY

Conceptual Demolition Cost Estimate No. 33707B, dated February 12, 2016, was prepared and is included as Exhibit 2. This cost estimate was prepared for retirement option 3, but includes accounts allowing the determination of cost estimates for retirement options 1 and 2 as well. A summary of the conceptual demolition cost estimates for all three (3) retirement options is provided in Exhibit 1 and detailed in the following tables.

The cost estimate is structured into a code of accounts as identified in Table 2-1.

**Table 2-1**
**Cost Estimate Code of Accounts**

| Account Number | Description |
|---|---|
| 10, 21, 22 | Demolition Costs (including steel, equipment & piping scrap value) |
| 18 | Scrap Value Costs |
| 91 | Other Direct & Construction Indirect Costs |
| 93 | Indirect Costs |
| 94 | Contingency Costs |
| 96 | Escalation Costs |

The results of the cost estimate for retirement option 3 are provided in Table 2-2 below.

**Table 2-2**
**Cost Estimate Results Summary**
**Retirement Option 3**

| Description | Total Cost |
|---|---|
| Demolition Cost | $3,711,338 |
| Scrap Value | ($92,058) |
| Direct Cost Subtotal | $3,619,279 |
| Indirect Cost | $371,000 |
| Contingency Cost | $830,000 |
| Escalation Cost | $0 |
| Total Project Cost | $4,820,280 |

The results of the cost estimate for retirement option 1 are provided in Table 2-3 below.

**Table 2-3**
**Cost Estimate Results Summary**
**Retirement Option 1**

| Description | Total Cost |
|---|---|
| Demolition Cost | $238,539 |
| Scrap Value | ($83,035) |
| Direct Cost Subtotal | $174,023 |
| Indirect Cost | $17,000 |
| Contingency Cost | $67,700 |
| Escalation Cost | $0 |
| Total Project Cost | $258,723 |

The results of the cost estimate for retirement option 2 are provided in Table 2-4 below.

**Table 2-4**
**Cost Estimate Results Summary**
**Retirement Option 2**

| Description | Total Cost |
|---|---|
| Demolition Cost | $3,375,501 |
| Scrap Value | ($83,035) |
| Direct Cost Subtotal | $3,292,465 |
| Indirect Cost | $337,000 |
| Contingency Cost | $755,000 |
| Escalation Cost | $0 |
| Total Project Cost | $4,384,465 |

Asbestos Removal Conceptual Cost Estimate No. 33739B, dated February 12, 2016, was prepared and is included as Exhibit 3. The total estimated cost for asbestos removal prior to plant dismantlement is $55,200. Quantities were derived from drawings and past experience. Asbestos removal applies to the powerhouse, thus the removal cost applies to all three (3) retirement options. The cost of asbestos removal is excluded from the total conceptual demolition cost estimates for each retirement option detailed in the tables above.

## 3.0 TECHNICAL BASIS

The scope of dismantlement is based on three (3) retirement options, as requested by AEP, as follows:

Retirement Option 1, Non-Power Operation: This scenario would consider leaving intact all of the existing water-impounding structures and the powerhouse. Only the electric generating units and their auxiliary equipment would be removed so as to preclude the generation of electricity by the former hydroelectric plant. In addition, the spillway would be modified as required in order to pass river flows and maintain the impoundment's water surface elevation at the current conditions.

Retirement Option 2, Partial Removal of the Dam Structures: This scenario would consider demolition and removal of certain elements of the hydroelectric site in order to drain the existing impoundment and create a natural river channel through the dam site. This would generally include removal of the generating units and powerhouse and possibly but not inclusively demolition and removal of substantial portions of concrete spillway structures. This option would address the removal and stabilization of any sediments that have accumulated at the upstream end of the dam and the stabilization of the newly exposed reservoir/riverbanks.

Retirement Option 3, Complete Removal of the Dam and Powerhouse: This scenario would consider complete removal of the electric generating components and powerhouse and complete removal of the dam. Similar to option 2, this option would address the removal and stabilization of any sediments that have accumulated at the upstream end of the dam and the stabilization of the newly exposed reservoir/riverbanks.

The scope of dismantlement for each retirement option, as interpreted from the definitions above, are identified on marked plant drawings included as Exhibit 4. The scope of dismantlement and the sequence of demolition for each retirement option are defined on these sketches.

Retirement options 2 and 3 include the same demolition work as retirement option 1, removal of the generating unit components from the powerhouse. The powerhouse is not removed in retirement option 1, but is removed in retirement option 3. For retirement option 2 the powerhouse may or may not be removed, depending on if removal of portions of the dam can restore river flow to natural flow without removing the powerhouse (refer to Exhibit 4).

For each of the retirement options the scope of sediment removal is based on the quantity that would be disturbed from the demolition work itself and not complete removal of all sediment potentially disturbed by the partial or complete removal of the dam. The subcontractor costs included in retirement options 2 and 3 are for lime stabilization of the sediment and removal of the sediment and other wastes (such as timber) to the waste disposal site. These costs do not apply to retirement option 1 since only generating unit components in the powerhouse are removed and this material has scrap value.

Retirement options 2 and 3 include the stabilization of newly exposed riverbanks, which include the dam area and areas upstream of the dam. The extent of stabilization for retirement option 3 may be slightly more than retirement option 2, since the entire dam is being removed in retirement option 3.

The following are excluded from the scope of the conceptual demolition cost estimates:

- Asbestos removal (separate cost estimate prepared).
- The conceptual demolition cost estimate includes the cost to remove the three (3) main power transformers located in the switchyard, but not the cost to remove the switchyard itself (and remaining components in the switchyard).
- The separate brick storage building near the entrance road will remain in place.
- Evaluation of the effect of the complete removal of the series of dams on the river watershed.
- Evaluation of the effect of the removal of any one dam, on either the upstream or downstream side dam and reservoir, after removal of the dam.
- Potential social or environmental impact of the draining of the reservoirs and the impact on property values or other community impact.
- The conceptual demolition cost estimate excludes any costs related to performing surveys to quantify the amount of sediment and chemical testing of the sediment. The quantity of sediment to be removed was estimated for retirement options 2 and 3 and the cost to remove the sediment is included in the conceptual demolition cost estimate. As stated above, the scope of sediment removal is based on the quantity that would be disturbed from the demolition work itself and not complete removal of the sediment potentially disturbed by the partial or complete removal of the dam.

The scope of the demolition cost estimate was reaffirmed during a review of the facility by two S&L employees in conjunction with a representative from Bradenburg Industrial Service Co. and AEP corporate and plant personnel. The facility review was held on Tuesday December 15, 2015.

## 4.0 COMMERCIAL BASIS

### 4.1 General Information

The Conceptual Demolition Cost Estimates prepared for the Constantine Hydroelectric Plant is a conceptual estimate of the cost to dismantle the powerhouse and dam in accordance with the scope defined for each of the three (3) retirement options. Costs were calculated for (1) demolition of existing plant structures and equipment and associated site restoration costs, (2) scrap value of steel, copper and stainless steel, as applicable, (3) associated indirect costs, and (4) contingency.

All units used in the cost estimate are U.S. Standard and all costs are in US Dollars (4$^{th}$ Quarter 2015 levels). A three (3) year demolition schedule is anticipated for retirement option 3 including asbestos removal (to be performed prior to start of demolition work). The schedule takes into consideration environmental permitting, asbestos removal which includes mapping out all asbestos contamination throughout the powerhouse and associated abatement, followed by total plant demolition and site restoration. The schedule for the other two (2) retirement options would be correspondingly less.

### 4.2 Quantities/Material Cost

Quantities of pieces of equipment and/or bulk material commodities used in the cost estimates were intended to be reasonable and representative of projects of this type. Material quantities were estimated from the hydroelectric plant drawings and data provided by AEP, and the information obtained from Plant personnel during the facility review.

### 4.3 Construction Labor Wages

Craft labor rates (Craft Hourly Rate) for the cost estimate were calculated as Union Labor rates for South Bend, Indiana, based on 2015, R. S. Means “Labor Rates for the Construction Industry”. The craft rates were incorporated into work crews appropriate for the activities by adding allowances for small tools, construction equipment, insurance, and site overheads to arrive at crew hourly rates detailed in the cost estimate. A 1.10 regional labor productivity multiplier was included based on Compass International Global Construction Yearbook, 2015 Edition, for union work in Indiana. National Maintenance

Agreement Rates (typically negotiated by AEP) do not apply as this work is assumed to be performed as a lump sum contract.

### 4.3.1 Labor Work Schedule and Incentives

The estimate assumed a 5x8 work week. No per diem or other labor incentives are included.

### 4.3.2 Construction Indirects

Allowances were included in the cost estimate as direct costs as noted for the following:

- Freight: Material and scrap freight included in the material and scrap costs.
- Additional Crane Allowance: None included. Cost of cranes and construction machinery are included in the labor wage rates.
- Mobilization and Demobilization: Included in labor wage rates.
- Scaffolding: Included in labor wage rates.
- Consumables: Included in material and labor costs.
- Per Diem Costs: Excluded from the estimate.
- Contractor's General and Administrative Costs and Profit: Included in the labor wage rates.

## 4.4 Scrap Value

The value of scrap was determined by a 3 month average (November and December 2015 and January 2016) using Zone 4 (USA Midwest) of the "Scrap Metals Market Watch" (www.americanrecycler.com).

Since the values obtained are delivered pieces, 25% of the values obtained were deducted to pay for separation, preparation and shipping to the mills. This resulted in realized prices of:

- Mixed Steel Value @ $118/Ton
- Copper Value @ $3,180/Ton
- Stainless Steel @ $675/Ton

Note: 1 Ton = 2,000 Lbs

All steel is considered to be mixed steel unless otherwise noted.

## 4.5 Indirect Costs

Allowances were included in the cost estimate as indirect costs as noted for the following:

- Engineering, Procurement and Project Services: None included.
- Construction Management Support: None included.
- Owners Cost: Included as 10.0% of the total direct cost. Owners Costs include owner project engineering, administration and construction management, permits and fees, legal expenses, taxes, removal of chemicals, etc.

## 4.6 Escalation

No allowance for escalation was included in the cost estimate. All costs are determined in 4$^{th}$ Quarter 2015 levels.

## 4.7 Contingency

Allowances were included in the cost estimate as contingency as noted for the following:

- Scrap Value: Included as 15.0% reduction in the salvage value resulting in a total net reduction in the salvage value. The contingency assumes a potential drop in salvage value thus increasing the project cost. Scrap costs are very volatile but by taking a 3-month average some of the effect of volatility is reduced. However there are other variables that affect scrap pricing such as the quantity and processing fees. The contingency applied is based on the estimators confidence in scrap pricing used in the demolition cost estimate.
- Material: Included as 20.0% of the total material cost.
- Labor: Included as 20.0% of the total labor cost.
- Indirect: Included as 20.0% of the total indirect cost.
- Subcontractor: Included as 20.0% of the total subcontractor cost.

## 4.8 Assumptions

The following assumptions apply to the cost estimates.

- The cost estimate for each retirement option is based on the scope and the demolition sequences defined on the sketches provided in Exhibit 4.
- All chemicals will be removed by the Owner prior to demolition, from the facilities to be demolished.

- All electrical equipment and wiring is de-energized prior to start of dismantlement. There is no reservoir control at this plant, hence electrical power is not required for retirement option 1. The tailwater at Constantine is controlled by the gated spillway structure at Mottville Hydroelectric Plant, approximately seven (7) miles downstream.
- No extraordinary environmental costs for demolition have been included.
- Handling, on-site and off-site disposal of hazardous materials would be performed in compliance with methods approved by Owner.
- The window glazing in the powerhouse may be asbestos contaminated and an allowance for removal and disposal is included in the asbestos removal cost estimate. There are twenty (20) control boards mounted on 3' x 9' transite (asbestos) panels and an allowance for removal and disposal is included in the asbestos removal cost estimate. There is no building or pipe insulation in the facility and consequently no insulation related asbestos contamination.
- Switchyards within the plant boundaries are not part of the scope, neither are access roads to these facilities. Fences and gates needed to protect the switchyard will be left in place.
- All demolished materials are considered debris, except for organic combustibles and non-embedded metals which have scrap value.
- The basis for salvage estimating is for scrap value only. No resale of equipment or material is included.
- Sediment removed due to demolition work is treated with lime and hauled offsite to an approved waste disposal facility.

## 5.0 REFERENCES

**5.1** Constantine Plant Drawings: One-Line Diagrams, No. 14-12001 and No. E-1000, 12/16/06.

**5.2** Findlay Engineering, Inc., Supporting Technical Information Document, Constantine Hydroelectric Project, October, 2005.

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# EXHIBIT 1
# Constantine Hydroelectric Plant
# Conceptual Demolition Cost Estimate Summary

Constantine Hydroelectric Plant
Indiana Michigan Power Company
American Electric Power Service Corporation
Estimate Number: 33707B

February 12, 2016

| | Retirement Option 1 | Retirement Option 2 | Retirement Option 3 |
|---|---|---|---|
| Demolition Cost | $ 238,539 | $ 3,375,501 | $ 3,711,338 |
| Scrap Value | $ (83,035) | $ (83,035) | $ (92,058) |
| Direct Cost Subtotal | $ 174,023 | $ 3,292,465 | $ 3,619,279 |
| Indirect Cost | $ 17,000 | $ 337,000 | $ 371,000 |
| Contingency Cost | $ 67,700 | $ 755,000 | $ 830,000 |
| Escalation Cost | $ - | $ - | $ - |
| Total Demolition Cost | $ 258,723 | $ 4,384,465 | $ 4,820,280 |

# EXHIBIT 2
# Constantine Hydroelectric Plant
# Conceptual Demolition Cost Estimate No. 33707B

# AEP CONSTANTINE
# HYDROELECTRIC PLANT DISMANTLEMENT STUDY
# CONCEPTUAL COST ESTIMATE

| | |
|---|---|
| **Client** | AEP |
| **Estimator** | RCK |
| **Labor rate table** | 15INSOU |
| **Project No.** | 13465-000 |
| **Station Name** | CONSTANTINE |
| **Unit** | ALL |
| **Estimate Date** | 02/12/2016 |
| **Reviewed By** | ADC |
| **Approved By** | MNO |
| **Estimate No.** | 33707B |
| **Estimate Class** | Conceptual |
| **Cost index** | INSOU |

**AEP CONSTANTINE**
**HYDROELECTRIC PLANT DISMANTLEMENT STUDY**
**CONCEPTUAL COST ESTIMATE**



| Area | Description | Subcontract Cost | Scrap Value | Material Cost | Man Hours | Labor Cost | Total Cost |
|---|---|---|---|---|---|---|---|
| ACCOUNT A | DEMOLITION ACCOUNT A | 18,520 | (83,035) | 83,209 | 1,411 | 155,330 | 174,023 |
| ACCOUNT B | DEMOLITION ACCOUNT B | 523,340 | | 1,485,812 | 14,749 | 1,109,290 | 3,118,442 |
| ACCOUNT C | DEMOLITION ACCOUNT C | (105,880) | (9,023) | | 4,890 | 441,717 | 326,814 |
| | TOTAL DIRECT | 435,980 | (92,058) | 1,569,021 | 21,050 | 1,706,337 | 3,619,279 |

## Estimate Totals

| Description | Amount | Totals | Hours |
|---|---|---|---|
| **Direct Costs:** | | | |
| Labor | 1,706,337 | | 21,050 |
| Material | 1,569,021 | | |
| Subcontract | 435,980 | | |
| Scrap Value | (92,058) | | |
| | **3,619,280** | **3,619,280** | |
| **Other Direct & Construction Indirect Costs:** | | | |
| 91-1 Scaffolding | | | |
| 91-2 Cost Due To OT 5-10's | | | |
| 91-3 Cost Due To OT 6-10's | | | |
| 91-4 Per Diem | | | |
| 91-5 Consumables | | | |
| 91-8 Freight on Material | | | |
| 91-9 Freight on Process Equip | | | |
| 91-10 Sales Tax | | | |
| 91-11 Contractors G&A | | | |
| 91-12 Contractors Profit | | | |
| | | **3,619,280** | |
| **Indirect Costs:** | | | |
| 93-1 Engineering Services | | | |
| 93-2 CM Support | | | |
| 93-3 Start-Up/Commissioning | | | |
| 93-4 Start-Up/Spare Parts | | | |
| 93-5 Excess Liability Insur. | | | |
| 93-6 Sales Tax On Indirects | | | |
| 93-7 Owners Cost | 371,000 | | |
| 93-8 EPC Fee | | | |
| | **371,000** | **3,990,280** | |
| **Contingency:** | | | |
| 94-1 Contingency on Material | 314,000 | | |
| 94-2 Contingency on Labor | 341,000 | | |
| 94-3 Contingency on Sub. | 87,000 | | |
| 94-6 Contingency on Scrap | 14,000 | | |
| 94-5 Contingency on Indirect | 74,000 | | |
| | **830,000** | **4,820,280** | |
| **Escalation:** | | | |
| 96-1 Escalation on Material | | | |
| 96-2 Escalation on Labor | | | |
| 96-3 Escalation on Subcontract | | | |
| 96-4 Escalation on Scrap | | | |
| 96-5 Escalation on Indirects | | | |
| | | **4,820,280** | |
| | | **4,820,280** | |
| ***Total*** | | ***4,820,280*** | |

| Area | Group | Phase | Description | Notes | Quantity | Man Hours | Crew Rate | Labor Cost | Material Cost | Subcontract Cost | Scrap Value | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ACCOUNT A | | | DEMOLITION ACCOUNT A | | | | | | | | | |
| | 10.00.00 | | WHOLE PLANT DEMOLITION | | | | | | | | | |
| | | 10.31.00 | MECHANICAL EQUIPMENT | | | | | | | | | |
| | | | DEMO .3 MW GENERATOR | 4 GENERATORS AT 6300# EA | 12.60 TN | 125 | 85.53 /MH | 10,670 | | - | | 10,670 |
| | | | DEMO TURBINE AND GEARS | 4 TURBINES AT 9300# EA | 18.60 TN | 184 | 85.53 /MH | 15,751 | | - | | 15,751 |
| | | | TURBINE ROOM 6.5 TON OVERHEAD CRANE | | 5.00 TN | 50 | 121.33 /MH | 6,006 | | - | | 6,006 |
| | | | MECHANICAL EQUIPMENT | | | 358 | | 32,428 | | | | 32,428 |
| | | 10.41.00 | ELECTRICAL EQUIPMENT | | | | | | | | | |
| | | | GENERATOR BUS TRANSFORMERS | 2.4 to 34.5 KV, 2.67 MVA (STEEL) | 8.40 TN | 25 | 80.14 /MH | 1,979 | | - | - | 1,979 |
| | | | GENERATOR BUS TRANSFORMERS | 2.4 to 34.5 KV, 2.67 MVA (CU) | 4.40 TN | 13 | 80.14 /MH | 1,037 | | - | - | 1,037 |
| | | | MISCELLANEOUS ELECTRICAL EQUIPMENT | | 4.00 TN | 12 | 80.14 /MH | 942 | | - | - | 942 |
| | | | ELECTRICAL EQUIPMENT | | | 49 | | 3,958 | | | | 3,958 |
| | | | WHOLE PLANT DEMOLITION | | | 408 | | 36,385 | | | | 36,385 |
| | 18.00.00 | | SCRAP VALUE | | | | | | | | | |
| | | 18.10.00 | MIXED STEEL | | | | | | | | | |
| | | | MIXED STEEL | 4 GENERATORS AT 6300# EA | -12.60 TN | | 79.62 /MH | | - | - | (1,488) | (1,488) |
| | | | MIXED STEEL | 4 TURBINES AT 9300# EA | -18.60 TN | | 79.62 /MH | | - | - | (2,196) | (2,196) |
| | | | MIXED STEEL | TURBINE ROOM 6.5 TON OVERHEAD CRANE | -5.00 TN | | 79.62 /MH | | - | - | (590) | (590) |
| | | | MIXED STEEL | 80 KW PROPANE ELECTRIC GENERATOR | -1.50 TN | | 79.62 /MH | | - | - | (177) | (177) |
| | | | MIXED STEEL | GENERATOR BUS TRANSFORMERS | -8.40 TN | | 79.62 /MH | | - | - | (992) | (992) |
| | | | MIXED STEEL | | | | | | | | (5,443) | (5,443) |
| | | 18.30.00 | COPPER | | | | | | | | | |
| | | | COPPER | 4 GENERATORS 4 @ 4000 LB EA | -8.00 TN | | 79.62 /MH | | - | - | (25,440) | (25,440) |
| | | | COPPER | CABLE | -6.00 TN | | 79.62 /MH | | - | - | (19,080) | (19,080) |
| | | | COPPER | MISC. TRANSFORMERS & MOTORS | -6.00 TN | | 79.62 /MH | | - | - | (19,080) | (19,080) |
| | | | COPPER | GENERATOR BUS TRANSFORMERS | -4.40 TN | | 79.62 /MH | | - | - | (13,992) | (13,992) |
| | | | COPPER | | | | | | | | (77,592) | (77,592) |
| | | | SCRAP VALUE | | | | | | | | (83,035) | (83,035) |
| | 21.00.00 | | CIVIL WORK | | | | | | | | | |
| | | 21.17.00 | EXCAVATION | | | | | | | | | |
| | | | MASS EXCAVATION, COMMON EARTH USING 1.5 CY BACKHOE AND (6) 12 CY DUMP TRUCKS, | DIKE EXCAVATION TO PROVIDE RACEWAY DRAINAGE- MATERIAL PLACED DIRECTLY DOWNSTREAM OF HEADGATES | 5,075.00 CY | 363 | 196.64 /MH | 71,360 | | - | - | 71,360 |
| | | | EXCAVATION | | | 363 | | 71,360 | | | | 71,360 |
| | | 21.41.00 | Erosion and Sedimentation Control | | | | | | | | | |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | RIPRAP PROTECTION AT DIKE MODIFICATION | 1,765.00 CY | 576 | 74.10 /MH | 42,718 | 72,189 | - | - | 114,906 |
| | | | Erosion and Sedimentation Control | | | 576 | | 42,718 | 72,189 | | | 114,906 |
| | | 21.65.00 | Soil Remediation | | | | | | | | | |
| | | | REMOVAL OF LOCALIZED SILT AT HEADGATE | LIME ADDITIVE FOR DRYING | 463.00 CY | | 196.64 /MH | | | 18,520 | - | 18,520 |
| | | | Soil Remediation | | | | | | | 18,520 | | 18,520 |
| | | | CIVIL WORK | | | 939 | | 114,078 | 72,189 | 18,520 | | 204,787 |
| | 22.00.00 | | CONCRETE | | | | | | | | | |
| | | 22.13.00 | Concrete | | | | | | | | | |
| | | | FLOWABLE FILL, 1500 PSI | FILL PENSTOCKS TO PREVENT BYPASS FLOW | 116.00 CY | 64 | 76.27 /MH | 4,867 | 11,020 | - | - | 15,887 |
| | | | Concrete | | | 64 | | 4,867 | 11,020 | | | 15,887 |
| | | | CONCRETE | | | 64 | | 4,867 | 11,020 | | | 15,887 |
| | | | ACCOUNT A DEMOLITION ACCOUNT A | | | 1,411 | | 155,330 | 83,209 | 18,520 | (83,035) | 174,023 |
| ACCOUNT B | | | DEMOLITION ACCOUNT B | | | | | | | | | |
| | 10.00.00 | | WHOLE PLANT DEMOLITION | | | | | | | | | |
| | | 10.22.00 | CONCRETE | | | | | | | | | |
| | | | EQUIPMENT/ BUILDING FOUNDATION | SPILLWAY THROAT | 670.00 CY | 829 | 89.94 /MH | 74,579 | | - | - | 74,579 |
| | | | CONCRETE | | | 829 | | 74,579 | | | | 74,579 |
| | | | WHOLE PLANT DEMOLITION | | | 829 | | 74,579 | | | | 74,579 |
| | 21.00.00 | | CIVIL WORK | | | | | | | | | |
| | | 21.17.00 | EXCAVATION | | | | | | | | | |

| Area | Group | Phase | Description | Notes | Quantity | Man Hours | Crew Rate | Labor Cost | Material Cost | Subcontract Cost | Scrap Value | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 21.17.00 | EXCAVATION | | | | | | | | | |
| | | | MASS EXCAVATION, COMMON EARTH USING 1.5 CY BACKHOE AND (6) 12 CY DUMP TRUCKS, | RIVERBED EXCAVATION FOR RIPRAP PLACEMENT | 90.00 CY | 6 | 196.64 /MH | 1,266 | | - | - | 1,266 |
| | | | EXCAVATION | | | 6 | | 1,266 | | | | 1,266 |
| | | 21.41.00 | Erosion and Sedimentation Control | | | | | | | | | |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | NEW STONE REQD IF CAUSEWAY STONE IS REUSED (24070-4297) | 19,773.00 CY | 6,458 | 74.10 /MH | 478,561 | 808,716 | - | - | 1,287,276 |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | FOR CAUSEWAYS | 4,297.00 CY | 1,403 | 74.10 /MH | 103,999 | 175,747 | - | - | 279,746 |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | RELOCATE CAUSE WAY STONE FOR RIVER BEND PR0TECTION | 4,297.00 CY | 1,403 | 74.10 /MH | 103,999 | | - | - | 103,999 |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | RIP RAP PROTECTION AT FLOOR SLABS TO REMAIN IN PLACE | 90.00 CY | 29 | 74.10 /MH | 2,178 | 3,681 | - | - | 5,859 |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | RIP RAP PROTECTION AT ABUTMENTS TO REMAIN IN PLACE (240-90) | 150.00 CY | 49 | 74.10 /MH | 3,630 | 6,135 | - | - | 9,765 |
| | | | Erosion and Sedimentation Control | | | 9,344 | | 692,368 | 994,279 | | | 1,686,647 |
| | | 21.47.00 | LANDSCAPING | | | | | | | | | |
| | | | HYDRO OR AIR SEED & MULCH & FERTILIZER | | 322.00 AC | 4,570 | 74.64 /MH | 341,078 | 491,533 | - | - | 832,611 |
| | | | LANDSCAPING | | | 4,570 | | 341,078 | 491,533 | | | 832,611 |
| | | 21.65.00 | Soil Remediation | | | | | | | | | |
| | | | REMOVAL OF LOCALIZED SILT AT DAM | LIME ADDITIVE FOR DRYING | 2,000.00 CY | | 196.64 /MH | | | 80,000 | - | 80,000 |
| | | | REMOVAL OF LOCALIZED SILT AT DAM | LOAD, MIX AND HAUL LIME AND SEDIMENT MIX (4000+2000) | 6,000.00 CY | | 196.64 /MH | | | 360,000 | - | 360,000 |
| | | | REMOVAL OF LOCALIZED SILT AT HEADGATE | LOAD, MIX AND HAUL LIME AND SEDIMENT MIX 926+463 | 1,389.00 CY | | 196.64 /MH | | | 83,340 | - | 83,340 |
| | | | Soil Remediation | | | | | | | 523,340 | | 523,340 |
| | | | CIVIL WORK | | | 13,920 | | 1,034,711 | 1,485,812 | 523,340 | | 3,043,863 |
| | | | ACCOUNT B DEMOLITION ACCOUNT B | | | 14,749 | | 1,109,290 | 1,485,812 | 523,340 | | 3,118,442 |
| ACCOUNT C | | | DEMOLITION ACCOUNT C | | | | | | | | | |
| | 10.00.00 | | WHOLE PLANT DEMOLITION | | | | | | | | | |
| | | 10.22.00 | CONCRETE | | | | | | | | | |
| | | | EQUIPMENT/ BUILDING FOUNDATION | SPILLWAY APRON | 579.00 CY | 717 | 89.94 /MH | 64,450 | | - | - | 64,450 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | HEADGATE BAYS | 738.00 CY | 913 | 89.94 /MH | 82,148 | | - | - | 82,148 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | SPILLWAY FOUNDATION | 358.00 CY | 443 | 89.94 /MH | 39,850 | | - | - | 39,850 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | POWER HOUSE | 1,270.00 CY | 1,572 | 89.94 /MH | 141,366 | | - | - | 141,366 |
| | | | CONCRETE | | | 3,645 | | 327,813 | | | | 327,813 |
| | | 10.23.00 | STEEL | | | | | | | | | |
| | | | STRUCTURAL AND GIRT STEEL | GENERATOR HOUSE 140'X58X50' | 101.50 TN | 113 | 79.62 /MH | 9,033 | | - | - | 9,033 |
| | | | STEEL | | | 113 | | 9,033 | | | | 9,033 |
| | | 10.24.00 | ARCHITECTURAL | | | | | | | | | |
| | | | GENERATOR HOUSE | 140X58X50' TALL | 203,000.00 CF | 871 | 89.81 /MH | 78,221 | | - | - | 78,221 |
| | | | ARCHITECTURAL | | | 871 | | 78,221 | | | | 78,221 |
| | | 10.31.00 | MECHANICAL EQUIPMENT | | | | | | | | | |
| | | | DEMO PENSTOCKS | 4 GENERATORS AT 7,800# EA | 15.60 TN | 154 | 85.53 /MH | 13,211 | | - | | 13,211 |
| | | | BAR RACKS | 4 AT 5 TONS EACH | 20.00 TN | 45 | 121.33 /MH | 5,406 | | - | | 5,406 |
| | | | SLUICE GATES | 1 AT 4 TONS EACH | 4.00 TN | 9 | 121.33 /MH | 1,081 | | - | | 1,081 |
| | | | STOP LOGS | 4 AT 5 TONS EACH | 20.00 TN | 45 | 121.33 /MH | 5,406 | | - | | 5,406 |
| | | | MECHANICAL EQUIPMENT | | | 252 | | 25,103 | | | | 25,103 |
| | | 10.86.00 | WASTE | | | | | | | | | |
| | | | WASTE - USER DEFINED | MISC | 1.00 LS | | 121.33 /MH | | | - | 10,000 | 10,000 |
| | | | WASTE | | | | | | | | 10,000 | 10,000 |
| | | | WHOLE PLANT DEMOLITION | | | 4,882 | | 440,170 | | | 10,000 | 450,170 |
| | 18.00.00 | | SCRAP VALUE | | | | | | | | | |
| | | 18.10.00 | MIXED STEEL | | | | | | | | | |
| | | | MIXED STEEL | DEMO PENSTOCKS | -15.60 TN | | 79.62 /MH | | - | - | (1,842) | (1,842) |
| | | | MIXED STEEL | BAR RACKS | -20.00 TN | | 79.62 /MH | | - | - | (2,362) | (2,362) |
| | | | MIXED STEEL | SLUICE GATES | -4.00 TN | | 79.62 /MH | | - | - | (472) | (472) |
| | | | MIXED STEEL | STOP LOGS | -20.00 TN | | 79.62 /MH | | - | - | (2,362) | (2,362) |
| | | | MIXED STEEL | GENERATOR HOUSE | -101.50 TN | | 79.62 /MH | | - | - | (11,985) | (11,985) |

| Area | Group | Phase | Description | Notes | Quantity | Man Hours | Crew Rate | Labor Cost | Material Cost | Subcontract Cost | Scrap Value | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MIXED STEEL | | | | | | | | (19,023) | (19,023) |
| | | | SCRAP VALUE | | | | | | | | (19,023) | (19,023) |
| | 21.00.00 | | CIVIL WORK | | | | | | | | | |
| | | 21.17.00 | EXCAVATION | | | | | | | | | |
| | | | MASS EXCAVATION, COMMON EARTH USING 1.5 CY BACKHOE AND (6) 12 CY DUMP TRUCKS, | RIVERBED EXCAVATION FOR RIPRAP PLACEMENT (200-90) | 110.00 CY | 8 | 196.64 /MH | 1,547 | | - | - | 1,547 |
| | | | EXCAVATION | | | 8 | | 1,547 | | | | 1,547 |
| | | 21.65.00 | Soil Remediation | | | | | | | | | |
| | | | REMOVAL OF LOCALIZED SILT AT DAM | LIME ADDITIVE FOR DRYING CREDIT (1519-2000) | -481.00 CY | | 196.64 /MH | | | (19,240) | - | (19,240) |
| | | | REMOVAL OF LOCALIZED SILT AT DAM | LOAD, MIX AND HAUL LIME AND SEDIMENT MIX CREDIT (4556-6000)) | -1,444.00 CY | | 196.64 /MH | | | (86,640) | - | (86,640) |
| | | | Soil Remediation | | | | | | | (105,880) | | (105,880) |
| | | | CIVIL WORK | | | 8 | | 1,547 | | (105,880) | | (104,333) |
| | | | **ACCOUNT C DEMOLITION ACCOUNT C** | | | **4,890** | | **441,717** | | **(105,880)** | **(9,023)** | **326,814** |

# EXHIBIT 3
# Constantine Hydroelectric Plant
# Asbestos Removal Conceptual Cost Estimate No. 33739B

# AEP CONSTANTINE
# HYDROELECTRIC PLANT DISMANTLEMENT STUDY - ASBESTOS REMOVAL
# CONCEPTUAL COST ESTIMATE

| | |
|---|---|
| **Client** | AEP |
| **Estimator** | RCK |
| **Labor rate table** | 15INSOU |
| **Project No.** | 13465-000 |
| **Station Name** | CONSTANTINE |
| **Unit** | ALL |
| **Estimate Date** | 02/12/2016 |
| **Reviewed By** | ADC |
| **Approved By** | MNO |
| **Estimate No.** | 33739B |
| **Estimate Class** | Conceptual |
| **Cost index** | INSOU |

**AEP CONSTANTINE**
**HYDROELECTRIC PLANT DISMANTLEMENT STUDY - ASBESTOS REMOVAL**
**CONCEPTUAL COST ESTIMATE**



| Area | Description | Subcontract Cost | Scrap Value | Material Cost | Man Hours | Labor Cost | Total Cost |
|---|---|---|---|---|---|---|---|
| ASBESTOS | ASBESTOS REMOVAL | 41,800 | | | | | 41,800 |
| | TOTAL DIRECT | 41,800 | | | | | 41,800 |

## Estimate Totals

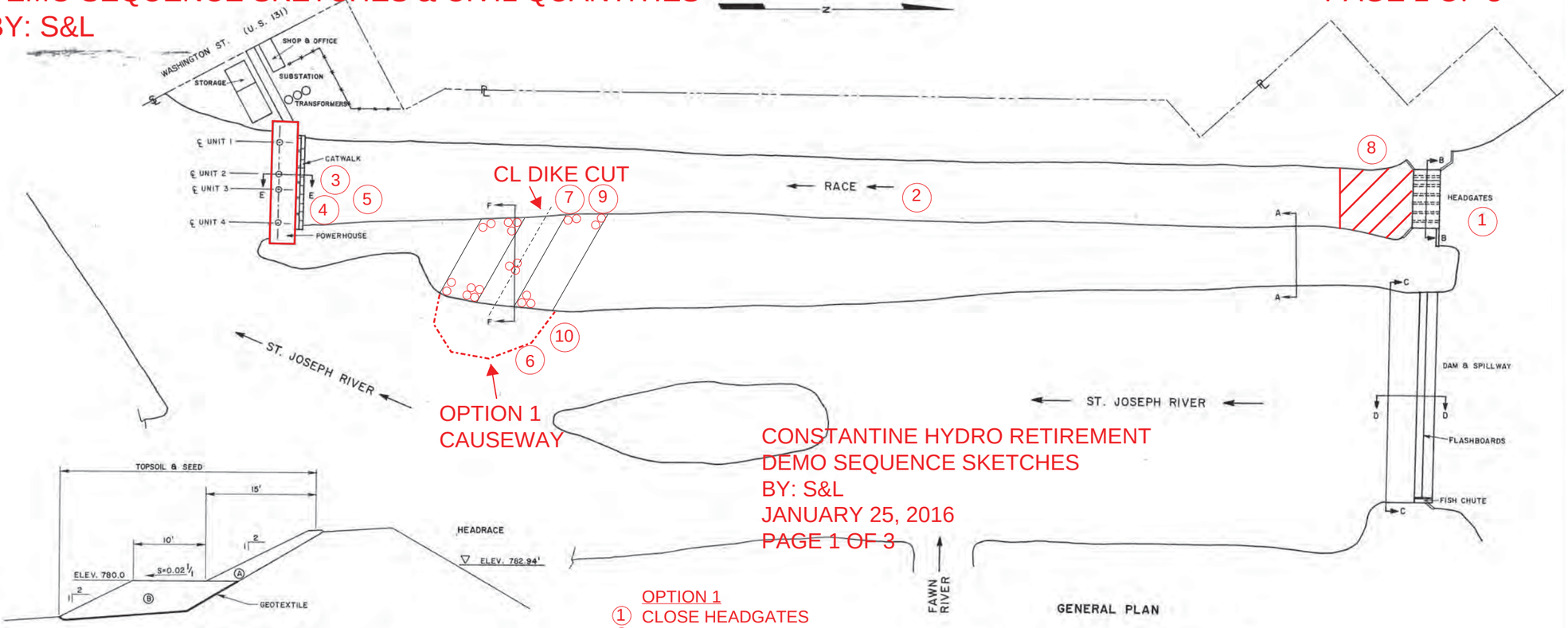
| Description | Amount | Totals | Hours |
|---|---|---|---|
| **Direct Costs:** | | | |
| Labor | | | |
| Material | | | |
| Subcontract | 41,800 | | |
| Scrap Value | | | |
| | **41,800** | **41,800** | |
| **Other Direct & Construction** | | | |
| **Indirect Costs:** | | | |
| 91-1 Scaffolding | | | |
| 91-2 Cost Due To OT 5-10's | | | |
| 91-3 Cost Due To OT 6-10's | | | |
| 91-4 Per Diem | | | |
| 91-5 Consumables | | | |
| 91-8 Freight on Material | | | |
| 91-9 Freight on Process Equip | | | |
| 91-10 Sales Tax | | | |
| 91-11 Contractors G&A | | | |
| 91-12 Contractors Profit | | | |
| | | **41,800** | |
| **Indirect Costs:** | | | |
| 93-1 Engineering Services | | | |
| 93-2 CM Support | | | |
| 93-3 Start-Up/Commissioning | | | |
| 93-4 Start-Up/Spare Parts | | | |
| 93-5 Excess Liability Insur. | | | |
| 93-6 Sales Tax On Indirects | | | |
| 93-7 Owners Cost | 4,200 | | |
| 93-8 EPC Fee | | | |
| | **4,200** | **46,000** | |
| **Contingency:** | | | |
| 94-1 Contingency on Material | | | |
| 94-2 Contingency on Labor | | | |
| 94-3 Contingency on Sub. | 8,400 | | |
| 94-6 Contingency on Scrap | | | |
| 94-5 Contingency on Indirect | 800 | | |
| | **9,200** | **55,200** | |
| **Escalation:** | | | |
| 96-1 Escalation on Material | | | |
| 96-2 Escalation on Labor | | | |
| 96-3 Escalation on Subcontract | | | |
| 96-4 Escalation on Scrap | | | |
| 96-5 Escalation on Indirects | | | |
| | | **55,200** | |
| | | **55,200** | |
| ***Total*** | | ***55,200*** | |

| Area | Group | Phase | Description | Notes | Quantity | Man Hours | Crew Rate | Labor Cost | Material Cost | Subcontract Cost | Scrap Value | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ASBESTOS | | | ASBESTOS REMOVAL | | | | | | | | | |
| | 10.00.00 | | WHOLE PLANT DEMOLITION | | | | | | | | | |
| | | 10.37.00 | ASBESTOS REMOVAL | | | | | | | | | |
| | | | ASBESTOS REMOVAL - MISC MATERIALS | WINDOW CAULKING MISC MATERIALS | 2.00 CY | | 121.33 /MH | | | 3,800 | - | 3,800 |
| | | | ASBESTOS REMOVAL - CONTROL /INSTRUMENT PANELS | 20 PANELS 1X3X9' TALL | 20.00 CY | | 121.33 /MH | | | 38,000 | - | 38,000 |
| | | | ASBESTOS REMOVAL | | | | | | | 41,800 | | 41,800 |
| | | | WHOLE PLANT DEMOLITION | | | | | | | 41,800 | | 41,800 |
| | | | ASBESTOS ASBESTOS REMOVAL | | | | | | | 41,800 | | 41,800 |

# EXHIBIT 4
# Constantine Hydroelectric Plant
# Retirement Option 1-3 Demolition Scope and Sequence

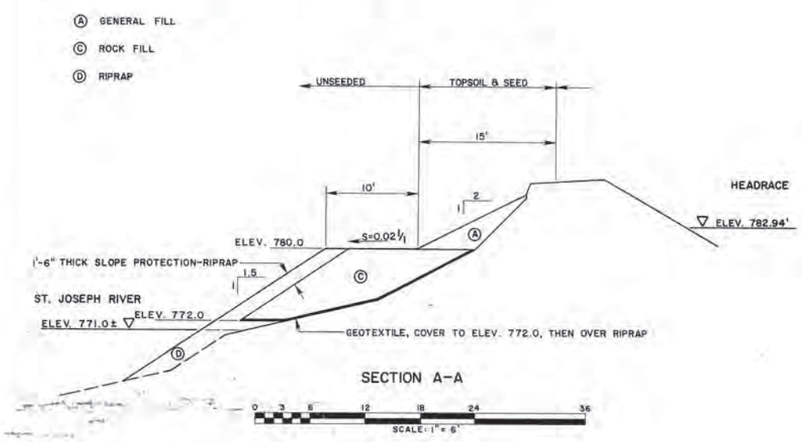
CONSTANTINE HYDRO RETIREMENT
DEMO SEQUENCE SKETCHES & CIVIL QUANTITIES
BY: S&L

JANUARY 25, 2016
PAGE 1 OF 8

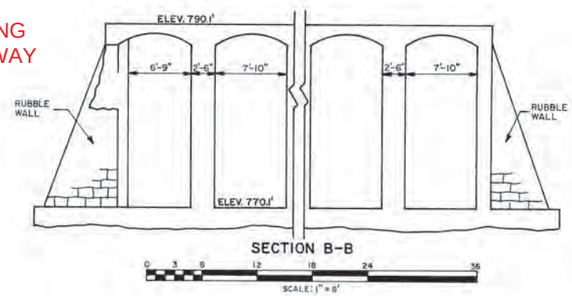









OPTION 1
1. CLOSE HEADGATES
2. DRAIN HEADRACE
3. INSTALL STOPLOGS
4. REMOVE EQUIPMENT
5. GROUT PENSTOCKS
6. CONSTRUCT CAUSEWAY
7. CUT DIKE
8. PLACE CUT MATERIAL BEHIND HEADGATES
9. PLACE RIPRAP AT NEW DIKE OPENING
10. REMOVE CAUSEWAY




THIS DRAWING IS A PART OF THE APPLICATION FOR LICENSE MADE BY THE UNDERSIGNED THIS 12 DAY OF Sept, 19 32

MICHIGAN POWER COMPANY
BY A.H. Williams Jr.
VICE PRESIDENT

EXHIBIT F
SHEET 1 OF 3

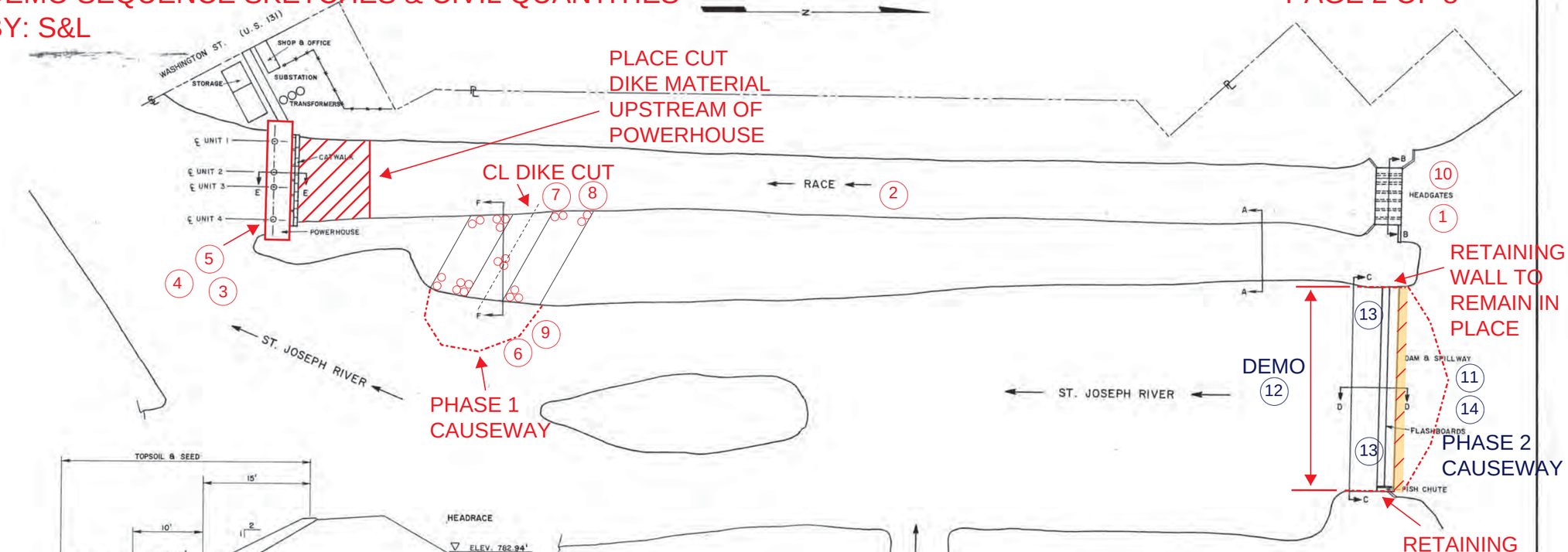
MICHIGAN POWER COMPANY
CONSTANTINE HYDRO PROJECT
PROJECT NO. 10661 MICHIGAN
GENERAL DESIGN DRAWING
PLAN AND SECTIONS

FERC NO. 10661-1

CONSTANTINE HYDRO RETIREMENT
DEMO SEQUENCE SKETCHES
BY: S&L
JANUARY 25, 2016
PAGE 1 OF 3

# CONSTANTINE HYDRO RETIREMENT
# DEMO SEQUENCE SKETCHES & CIVIL QUANTITIES
BY: S&L

JANUARY 25, 2016
PAGE 2 OF 8




PHASE 1
1. CLOSE HEADGATES
2. DRAIN RACEWAY
3. INSTALL STOPLOGS
4. REMOVE EQUIPMENT
5. GROUT PENSTOCKS
6. CONSTRUCT CAUSEWAY
7. CUT DIKE
8. PLACE RIPRAP AT NEW DIKE OPENING
9. REMOVE CAUSEWAY
10. OPEN HEADGATES

PHASE 2
11. CONSTRUCT CAUSEWAY
12. DEMO SPILLWAY SECTIONS
13. PLACE RIPRAP PROTECTION
14. REMOVE CAUSEWAY

OPTION 2

THIS DRAWING IS A PART OF THE APPLICATION FOR LICENSE MADE BY THE UNDERSIGNED THIS 12 DAY OF Sept, 19 3?

MICHIGAN POWER COMPANY
BY A.H. Williams Jr.
VICE PRESIDENT

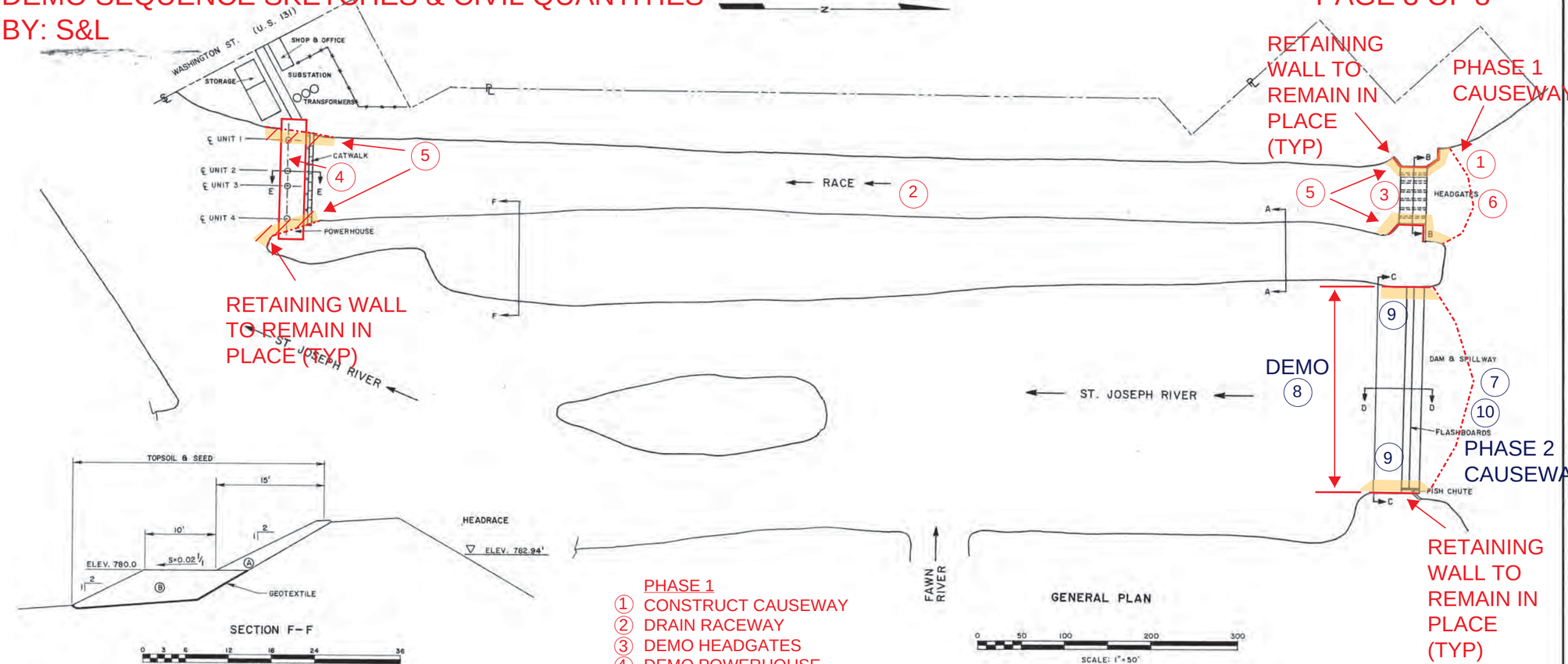
EXHIBIT F
SHEET 1 OF 3

MICHIGAN POWER COMPANY
CONSTANTINE HYDRO PROJECT
PROJECT NO. 10661 MICHIGAN
GENERAL DESIGN DRAWING
PLAN AND SECTIONS

FERC NO. 10661-1

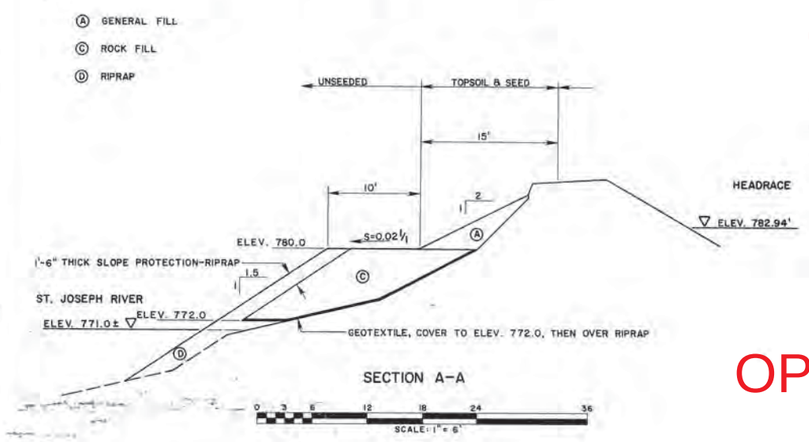
# CONSTANTINE HYDRO RETIREMENT
# DEMO SEQUENCE SKETCHES & CIVIL QUANTITIES
BY: S&L

JANUARY 25, 2016
PAGE 3 OF 8





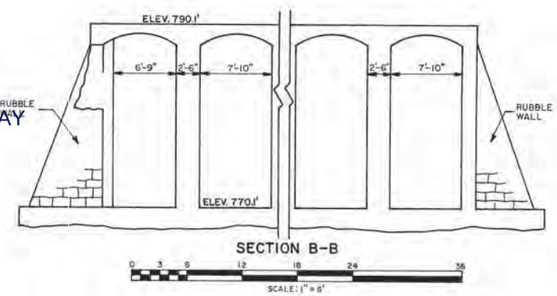





PHASE 1
① CONSTRUCT CAUSEWAY
② DRAIN RACEWAY
③ DEMO HEADGATES
④ DEMO POWERHOUSE
⑤ PLACE RIPRAP AT RETAINING WALLS
⑥ REMOVE CAUSEWAY

PHASE 2
⑦ CONSTRUCT CAUSEWAY
⑧ DEMO SPILLWAY
⑨ PLACE RIPRAP PROTECTION AT RETAINING WALLS
⑩ REMOVE CAUSEWAY

OPTION 3




THIS DRAWING IS A PART OF THE APPLICATION FOR LICENSE MADE BY THE UNDERSIGNED THIS
12 DAY OF Sept, 19 32

MICHIGAN POWER COMPANY
BY A.H. Williams Jr.
VICE PRESIDENT

EXHIBIT F
SHEET 1 OF 3

MICHIGAN POWER COMPANY
CONSTANTINE HYDRO PROJECT
PROJECT NO. 10661 MICHIGAN
GENERAL DESIGN DRAWING
PLAN AND SECTIONS

FERC NO. 10661-1

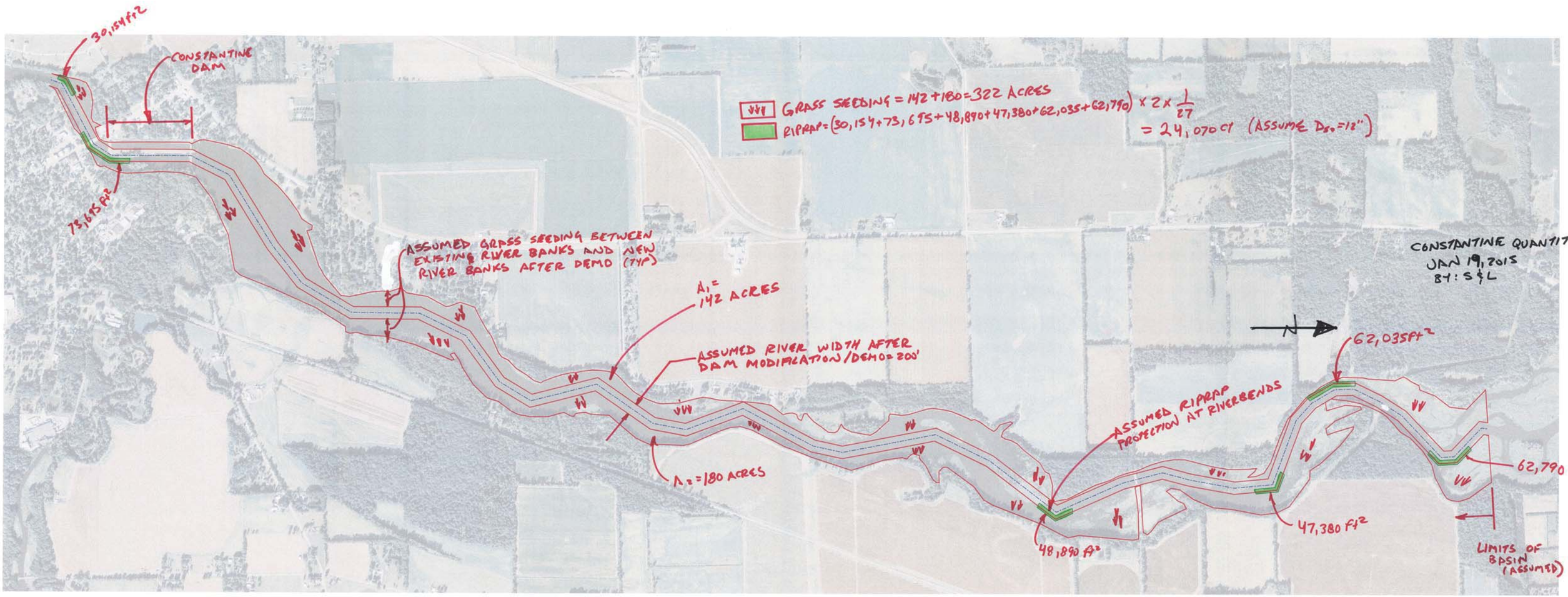
Indiana Michigan Power Company
Attachment JAC-3
Witness; Cash
Page 99 of 205

| CONSTANTINE | | | |
|---|---|---|---|
| OPTION 1 | | | |
| ITEM | QUANTITY | UNIT | REMARKS |
| DIKE EXCAVATION | 5,075 | CY | DIKE EXCAVATION TO DRAIN HEADRACE. PLACE MATERIAL BEHIND HEADGATE |
| RIPRAP PROTECTION AT DIKE MODIFICATION | 1,765 | CY | 2 ft riprap protection @ D(50)=12" |

| OPTION 2 | | | |
|---|---|---|---|
| ITEM | QUANTITY | UNIT | REMARKS |
| GRASS SEEDING | 322 | ACRE | |
| RIPRAP PROTECTION | 24,070 | CY | 2 ft riprap protection @ D(50)=12" |
| DIKE EXCAVATION | 5,075 | CY | DIKE EXCAVATION TO DRAIN HEADRACE. PLACE MATERIAL UPSTREAM OF POWERHOUSE |
| RIPRAP PROTECTION AT DIKE MODIFICATION | 1,765 | CY | 2 ft riprap protection @ D(50)=12" |
| RIPRAP PROTECTION AT FLOOR SLAB TO REMAIN IN PLACE | 90 | CY | 2 ft riprap protection @ D(50)=12" |
| RIVERBED EXCAVATION FOR RIPRAP PLACEMENT | 90 | CY | TO BE REPLACED BY RIPRAP |

| OPTION 3 | | | |
|---|---|---|---|
| ITEM | QUANTITY | UNIT | REMARKS |
| GRASS SEEDING | 322 | ACRE | |
| RIPRAP PROTECTION AT RIVER BENDS | 24,070 | CY | 2 ft riprap protection @ D(50)=12" |
| RIVERBED EXCAVATION FOR RIPRAP | 200 | CY | TO BE REPLACED BY RIPRAP |
| RIPRAP PROTECTION AT ABUTMENTS | 240 | CY | 2 ft riprap protection @ D(50)=12" |

Note: Localized miscellaneous silt removal and earthwork as part of dam demolition by Brandenburg


30,154 ft²
CONSTANTINE DAM
73,675 ft²
GRASS SEEDING = 142 + 180 = 322 ACRES
RIPRAP = (30,154 + 73,675 + 48,890 + 47,380 + 62,035 + 62,790) x 2 x 1/27
= 24,070 CY (ASSUME D50 = 12")
ASSUMED GRASS SEEDING BETWEEN EXISTING RIVER BANKS AND NEW RIVER BANKS AFTER DEMO (TYP)
A1 = 142 ACRES
ASSUMED RIVER WIDTH AFTER DAM MODIFICATION/DEMO = 200'
A2 = 180 ACRES
ASSUMED RIPRAP PROTECTION AT RIVERBENDS
48,890 ft²
47,380 ft²
62,035 ft²
62,790 ft²
LIMITS OF BASIN (ASSUMED)
CONSTANTINE QUANTITIES
JAN 19, 2015
BY: S&L
500' 0' 500' 1000'
GRAPHIC SCALE

2' DEEP RIPRAP PROTECTION
$A_{RIPRAP} = 23,830 ft^2$
$V_{RIPRAP} = (23,930) \times 2 \times \frac{1}{27} = 1,765 CY$ (*)

PLACE 5,075 CY OF CUT DOWNSTREAM OF HEADGATES

$A_{RIPRAP} = 23,830 ft^2$

QUANTITY
* APPLIES TO OPTION 1 & 2

WASHINGTON ST. (U.S. 131)
SHOP & OFFICE
STORAGE
SUBSTATION
TRANSFORMERS
℄ UNIT 1
℄ UNIT 2
℄ UNIT 3
℄ UNIT 4
CATWALK
POWERHOUSE
TOP OF RIPRAP EL. 784
RIPRAP PROTECTION
RACE
HEADGATES
NEW SPILLWAY
B SPILLWAY EL. 767
2:1 SLOPE (TYP.)
TOP OF SPILLWAY EL. 787.5' (TYP.)
FLOW
35'
3.5'
ST. JOSEPH RIVER
DAM & SPILLWAY
FLASHBOARDS
FISH CHUTE

$A_A = 0$
$A_B = 1200 ft^2$
$A_C = 1200 ft^2$
$A_D = 0$

$V_{CUT} = V_{A \to B} = (0+1200)\frac{1}{2} \times 39 \times 1/27 = 870 CY$
$V_{B \to C} = (1200+1200)\frac{1}{2} \times 75 \times 1/27 = 3335 CY$
$V_{C \to D} = V_{AB} = 870 CY$
$\Sigma V = 870 + 3335 + 870 = 5,075 CY$ (CUT) (*)

T/DIKE EL. 787.5
HEADRACE
ELEV. 782.94'
TOPSOIL & SEED
15'
10'
2
1
ELEV. 780.0
S=0.02 1/1
GEOTEXTILE
A = 1200 Ft²
B/RACE EL. 769 +/-
B/RIVER EL. 763 +/-
SECTION F-F
SCALE: 1"=6'

FAWN RIVER
GENERAL PLAN
SCALE: 1"=50'

Ⓐ GENERAL FILL
Ⓒ ROCK FILL
Ⓓ RIPRAP

SECTION B & C
N.T.S.

UNSEEDED
TOPSOIL & SEED
15'
10'
2
1
HEADRACE
ELEV. 782.94'
ELEV. 780.0
S=0.02 1/1
1'-6" THICK SLOPE PROTECTION-RIPRAP
1.5
1
ST. JOSEPH RIVER
ELEV. 771.0±
ELEV. 772.0
GEOTEXTILE, COVER TO ELEV. 772.0, THEN OVER RIPRAP
SECTION A-A
SCALE: 1"=6'

ELEV. 790.1'
RUBBLE WALL
6'-9"
2'-6"
7'-10"
2'-6"
7'-10"
RUBBLE WALL
ELEV. 770.1'
SECTION B-B
SCALE: 1"=6'

THIS DRAWING IS A PART OF THE APPLICATION FOR LICENSE MADE BY THE UNDERSIGNED THIS 12 DAY OF Sept, 19 28

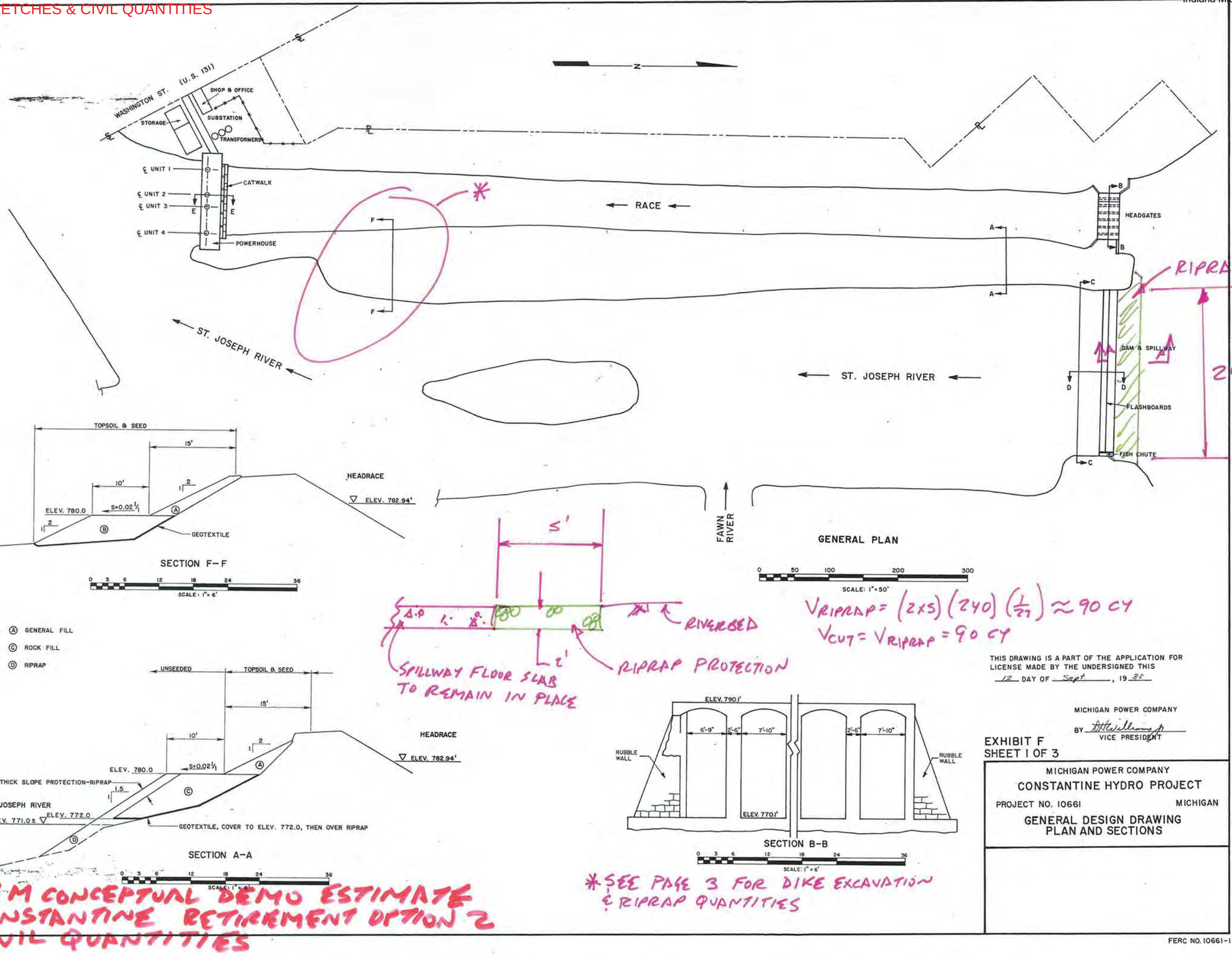
MICHIGAN POWER COMPANY
BY [signature]
VICE PRESIDENT

EXHIBIT F
SHEET 1 OF 3

MICHIGAN POWER COMPANY
CONSTANTINE HYDRO PROJECT
PROJECT NO. 10661 MICHIGAN
GENERAL DESIGN DRAWING
PLAN AND SECTIONS

FERC NO. 10661-1

I&M CONCEPTUAL DEMO ESTIMATE
CONSTANTINE RETIREMENT OPTION 1 & 2
CIVIL QUANTITIES




$V_{RIPRAP} = (2 \times 5)(240)\left(\frac{1}{27}\right) \approx 90$ CY

$V_{CUT} = V_{RIPRAP} = 90$ CY

THIS DRAWING IS A PART OF THE APPLICATION FOR LICENSE MADE BY THE UNDERSIGNED THIS 12 DAY OF Sept, 19 82

MICHIGAN POWER COMPANY
BY A.E. Williams Jr
VICE PRESIDENT

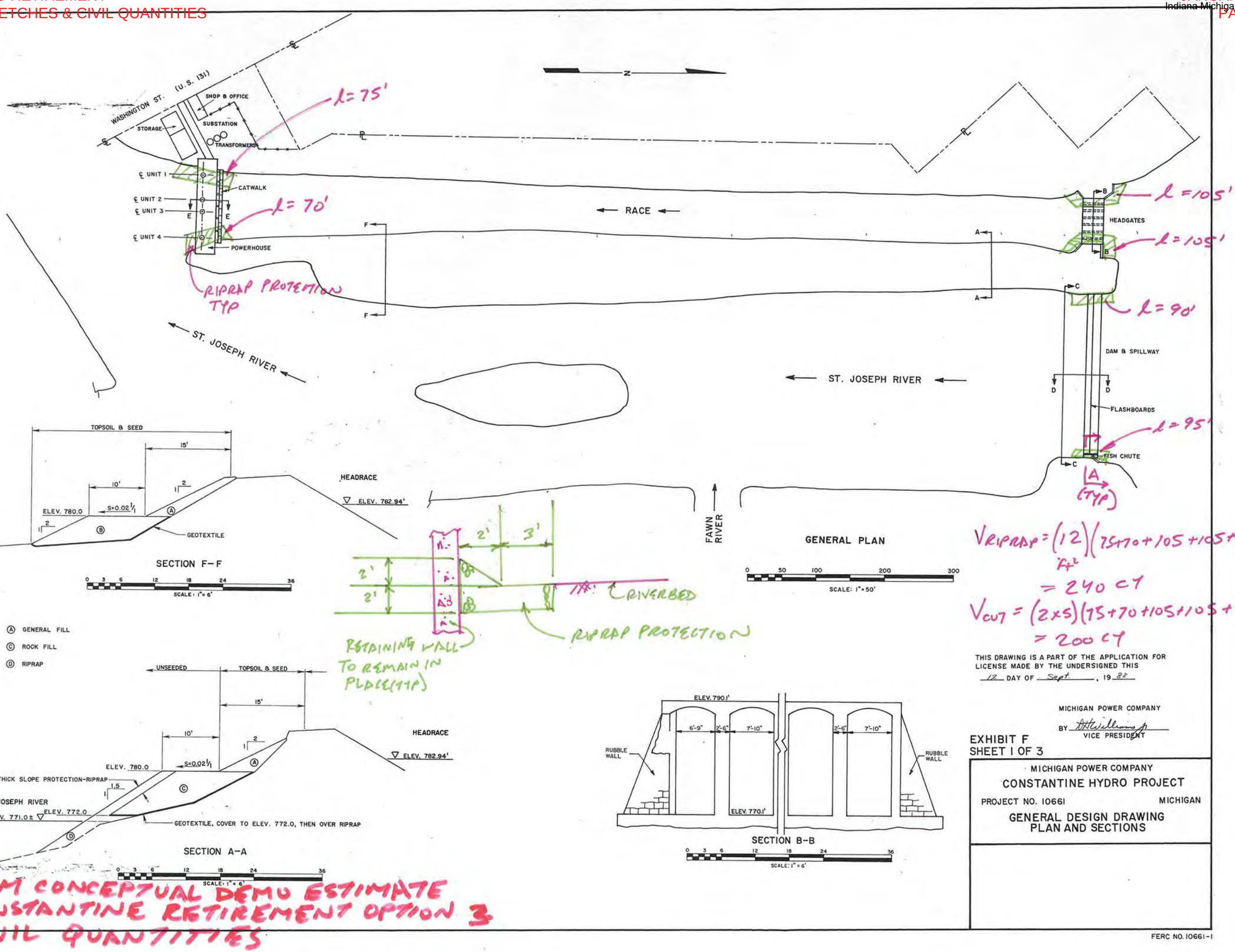
EXHIBIT F
SHEET 1 OF 3

MICHIGAN POWER COMPANY
CONSTANTINE HYDRO PROJECT
PROJECT NO. 10661 MICHIGAN
GENERAL DESIGN DRAWING
PLAN AND SECTIONS

FERC NO. 10661-1

T&M CONCEPTUAL DEMO ESTIMATE
CONSTANTINE RETIREMENT OPTION 2
CIVIL QUANTITIES

*SEE PAGE 3 FOR DIKE EXCAVATION & RIPRAP QUANTITIES




$V_{RIPRAP} = \left(\frac{12}{ft^2}\right)(75+70+105+105+90+95)\frac{1}{27}$
$= 240\ CY$
$V_{CUT} = (2\times5)(75+70+105+105+90+95)\frac{1}{27}$
$= 200\ CY$

THIS DRAWING IS A PART OF THE APPLICATION FOR LICENSE MADE BY THE UNDERSIGNED THIS
12 DAY OF Sept, 19 82

MICHIGAN POWER COMPANY
BY Otto Williams Jr
VICE PRESIDENT

EXHIBIT F
SHEET 1 OF 3

MICHIGAN POWER COMPANY
CONSTANTINE HYDRO PROJECT
PROJECT NO. 10661 MICHIGAN
GENERAL DESIGN DRAWING
PLAN AND SECTIONS

FERC NO. 10661-1

I&M CONCEPTUAL DEMO ESTIMATE
CONSTANTINE RETIREMENT OPTION 3
CIVIL QUANTITIES

Elkhart Hydroelectric Plant

# CONCEPTUAL DEMOLITION COST ESTIMATE

Prepared for:
Indiana Michigan Power Company (Owner)
and American Electric Power Service Corporation

Project No. 13465-000
February 12, 2016
Revision 0

55 East Monroe Street
Chicago, IL 60603-5780 USA

# Issue Summary Page

| Revision Number | Date | Purpose | Prepared By | Reviewed By | Approved By | Pages Affected |
|---|---|---|---|---|---|---|
| A | 02/01/16 | Comments | R. C. Kinsinger | A.D. Chapin<br>D. F. Franczak | M. N. Ozan | All |
| 0 | 02/12/16 | Use | R. C. Kinsinger<br>RKinsinger RC | A.D. Chapin<br>AChapin<br>D. F. Franczak<br>D.F. Franczak | T. J. Meehan<br>JMeehan | All |

## TABLE OF CONTENTS

## 1.0 INTRODUCTION

The Elkhart Hydroelectric Plant located in the City of Elkhart, Indiana is owned and operated by Indiana Michigan Power Company (I&M), a subsidiary of American Electric Power (AEP). The plant consists of (from right to left referenced facing downstream) a gated reinforced concrete spillway, an integral intake and powerhouse at the south (left) end of the spillway and concrete retaining walls at both abutments. Between the spillway and powerhouse, there is a concrete gravity cantilevered wall that extends downstream. The spillway is equipped with eleven (11) tainter gates which regulate headwater. The powerhouse consists of the intake and turbine pits followed by the generator room. The powerhouse contains three (3) horizontal shaft operating turbine generators. Unit 1 is rated at 1.44 MW and was installed in 1913 and Units 2 and 3 are rated at 1 MW each and were installed in 1921.

AEP recently contracted S&L to prepare conceptual demolition cost estimates considering three (3) retirement options defined as follows: (1) Option 1, Non-Power Operation, (2) Option 2, Partial Removal of the Dam Structures, and (3) Option 3, Complete Removal of the Dam and Powerhouse. Also, in addition S&L was requested to prepare a separate Asbestos Removal Conceptual Cost Estimate.

The objective of the conceptual demolition cost estimates is to determine the gross demolition costs for Elkhart Hydroelectric Plant (including gross salvage credits and any other benefits), in support of documenting a component of future AEP book depreciation rates to be approved by the I&M's state commissions and potential future inclusion in submittal of a rate case to the state commissions, and other potential uses. The cost estimate considers the demolition/dismantlement methodology which complies with current OSHA rules and regulations.

## 2.0 COST ESTIMATE SUMMARY

Conceptual Demolition Cost Estimate No. 33708B, dated February 12, 2016, was prepared and is included as Exhibit 2. This cost estimate was prepared for retirement option 3, but includes accounts allowing the determination of cost estimates for retirement options 1 and 2 as well. A summary of the conceptual demolition cost estimates for all three (3) retirement options is provided in Exhibit 1 and detailed in the following tables.

The cost estimate is structured into a code of accounts as identified in Table 2-1.

**Table 2-1**
**Cost Estimate Code of Accounts**

| Account Number | Description |
|---|---|
| 10, 21, 22 | Demolition Costs (including steel, equipment & piping scrap value) |
| 18 | Scrap Value Costs |
| 91 | Other Direct & Construction Indirect Costs |
| 93 | Indirect Costs |
| 94 | Contingency Costs |
| 96 | Escalation Costs |

The results of the cost estimate for retirement option 3 are provided in Table 2-2 below.

**Table 2-2**
**Cost Estimate Results Summary**
**Retirement Option 3**

| Description | Total Cost |
|---|---|
| Demolition Cost | $7,177,344 |
| Scrap Value | ($165,008) |
| Direct Cost Subtotal | $7,012,335 |
| Indirect Cost | $718,000 |
| Contingency Cost | $1,604,000 |
| Escalation Cost | $0 |
| Total Project Cost | $9,334,335 |

The results of the cost estimate for retirement option 1 are provided in Table 2-3 below.

**Table 2-3**
**Cost Estimate Results Summary**
**Retirement Option 1**

| Description | Total Cost |
|---|---|
| Demolition Cost | $68,721 |
| Scrap Value | ($42,715) |
| Direct Cost Subtotal | $26,005 |
| Indirect Cost | $2,000 |
| Contingency Cost | $20,000 |
| Escalation Cost | $0 |
| Total Project Cost | $48,005 |

The results of the cost estimate for retirement option 2 are provided in Table 2-4 below.

**Table 2-4**
**Cost Estimate Results Summary**
**Retirement Option 2**

| Description | Total Cost |
|---|---|
| Demolition Cost | $5,182,983 |
| Scrap Value | ($148,382) |
| Direct Cost Subtotal | $5,034,600 |
| Indirect Cost | $515,000 |
| Contingency Cost | $1,161,900 |
| Escalation Cost | $0 |
| Total Project Cost | $6,711,500 |

Asbestos Removal Conceptual Cost Estimate No. 33740B, dated February 12, 2016, was prepared and is included as Exhibit 3. The total estimated cost for asbestos removal prior to plant dismantlement is $363,660. Quantities were derived from drawings and past experience. Asbestos removal applies to the powerhouse, thus the removal cost applies to all three (3) retirement options. The cost of asbestos removal is excluded from the total conceptual demolition cost estimates for each retirement option detailed in the tables above.

## 3.0 TECHNICAL BASIS

The scope of dismantlement is based on three (3) retirement options, as requested by AEP, as follows:

Retirement Option 1, Non-Power Operation: This scenario would consider leaving intact all of the existing water-impounding structures and the powerhouse. Only the electric generating units and their auxiliary equipment would be removed so as to preclude the generation of electricity by the former hydroelectric plant. In addition, the spillway would be modified as required in order to pass river flows and maintain the impoundment's water surface elevation at the current conditions.

Retirement Option 2, Partial Removal of the Dam Structures: This scenario would consider demolition and removal of certain elements of the hydroelectric site in order to drain the existing impoundment and create a natural river channel through the dam site. This would generally include removal of the generating units and powerhouse and possibly but not inclusively demolition and removal of substantial portions of concrete spillway structures. This option would address the removal and stabilization of any sediments that have accumulated at the upstream end of the dam and the stabilization of the newly exposed reservoir/riverbanks.

Retirement Option 3, Complete Removal of the Dam and Powerhouse: This scenario would consider complete removal of the electric generating components and powerhouse and complete removal of the dam. Similar to option 2, this option would address the removal and stabilization of any sediments that have accumulated at the upstream end of the dam and the stabilization of the newly exposed reservoir/riverbanks.

The scope of dismantlement for each retirement option, as interpreted from the definitions above, are identified on marked plant drawings included as Exhibit 4. The scope of dismantlement and the sequence of demolition for each retirement option are defined on these sketches.

Retirement options 2 and 3 include the same demolition work as retirement option 1, removal of the generating unit components from the powerhouse. The powerhouse is not removed in retirement option 1, but is removed in retirement option 3. For retirement option 2 the powerhouse may or may not be removed, depending on if removal of portions of the dam can restore river flow to natural flow without removing the powerhouse (refer to Exhibit 4).

For each of the retirement options the scope of sediment removal is based on the quantity that would be disturbed from the demolition work itself and not complete removal of all sediment potentially disturbed by the partial or complete removal of the dam. The subcontractor costs included in retirement options 2 and 3 are for lime stabilization of the sediment and removal of the sediment and other wastes (such as timber) to the waste disposal site. These costs do not apply to retirement option 1 since only generating unit components in the powerhouse are removed and this material has scrap value.

Retirement options 2 and 3 include the stabilization of newly exposed riverbanks, which include the dam area and areas upstream of the dam. The extent of stabilization for retirement option 3 may be slightly more than retirement option 2, since the entire dam is being removed in retirement option 3.

The following are excluded from the scope of the conceptual demolition cost estimates:

- Asbestos removal (separate cost estimate prepared).
- The conceptual demolition cost estimate includes the cost to remove the two (2) main power transformers located in the switchyard, but not the cost to remove the switchyard itself (and remaining components in the switchyard).
- Evaluation of the effect of the complete removal of the series of dams on the river watershed.
- Evaluation of the effect of the removal of any one dam, on either the upstream or downstream side dam and reservoir, after removal of the dam.
- Potential social or environmental impact of the draining of the reservoirs and the impact on property values or other community impact.
- The conceptual demolition cost estimate excludes any costs related to performing surveys to quantify the amount of sediment and chemical testing of the sediment. The quantity of sediment to be removed was estimated for retirement options 2 and 3 and the cost to remove the sediment is included in the conceptual demolition cost estimate. As stated above, the scope of sediment removal is based on the quantity that would be disturbed from the demolition work itself and not complete removal of the sediment potentially disturbed by the partial or complete removal of the dam.

The scope of the demolition cost estimate was reaffirmed during a review of the facility by two S&L employees in conjunction with a representative from Bradenburg Industrial Service Co. and AEP corporate and plant personnel. The facility review was held on Tuesday December 15, 2015.

## 4.0 COMMERCIAL BASIS

### 4.1 General Information

The Conceptual Demolition Cost Estimates prepared for the Elkhart Hydroelectric Plant is a conceptual estimate of the cost to dismantle the powerhouse and dam in accordance with the scope defined for each of the three (3) retirement options. Costs were calculated for (1) demolition of existing plant structures and equipment and associated site restoration costs, (2) scrap value of steel, copper and stainless steel, as applicable, (3) associated indirect costs, and (4) contingency.

All units used in the cost estimate are U.S. Standard and all costs are in US Dollars (4$^{th}$ Quarter 2015 levels). A three (3) year demolition schedule is anticipated for retirement option 3 including asbestos removal (to be performed prior to start of demolition work). The schedule takes into consideration environmental permitting, asbestos removal which includes mapping out all asbestos contamination throughout the powerhouse and associated abatement, followed by total plant demolition and site restoration. The schedule for the other two (2) retirement options would be correspondingly less.

### 4.2 Quantities/Material Cost

Quantities of pieces of equipment and/or bulk material commodities used in the cost estimates were intended to be reasonable and representative of projects of this type. Material quantities were estimated from the hydroelectric plant drawings and data provided by AEP, and the information obtained from Plant personnel during the facility review.

### 4.3 Construction Labor Wages

Craft labor rates (Craft Hourly Rate) for the cost estimate were calculated as Union Labor rates for South Bend, Indiana, based on 2015, R. S. Means “Labor Rates for the Construction Industry”. The craft rates were incorporated into work crews appropriate for the activities by adding allowances for small tools, construction equipment, insurance, and site overheads to arrive at crew hourly rates detailed in the cost estimate. A 1.10 regional labor productivity multiplier was included based on Compass International Global Construction Yearbook, 2015 Edition, for union work in Indiana. National Maintenance

Agreement Rates (typically negotiated by AEP) do not apply as this work is assumed to be performed as a lump sum contract.

### 4.3.1 Labor Work Schedule and Incentives

The estimate assumed a 5x8 work week. No per diem or other labor incentives are included.

### 4.3.2 Construction Indirects

Allowances were included in the cost estimate as direct costs as noted for the following:

- Freight: Material and scrap freight included in the material and scrap costs.
- Additional Crane Allowance: None included. Cost of cranes and construction machinery are included in the labor wage rates.
- Mobilization and Demobilization: Included in labor wage rates.
- Scaffolding: Included in labor wage rates.
- Consumables: Included in material and labor costs.
- Per Diem Costs: Excluded from the estimate.
- Contractor's General and Administrative Costs and Profit: Included in the labor wage rates.

## 4.4 Scrap Value

The value of scrap was determined by a 3 month average (November and December 2015 and January 2016) using Zone 4 (USA Midwest) of the "Scrap Metals Market Watch" (www.americanrecycler.com).

Since the values obtained are delivered pieces, 25% of the values obtained were deducted to pay for separation, preparation and shipping to the mills. This resulted in realized prices of:

- Mixed Steel Value @ $118/Ton
- Copper Value @ $3,180/Ton
- Stainless Steel @ $675/Ton

Note: 1 Ton = 2,000 Lbs

All steel is considered to be mixed steel unless otherwise noted.

### 4.5 Indirect Costs

Allowances were included in the cost estimate as indirect costs as noted for the following:

- Engineering, Procurement and Project Services: None included.
- Construction Management Support: None included.
- Owners Cost: Included as 10.0% of the total direct cost. Owners Costs include owner project engineering, administration and construction management, permits and fees, legal expenses, taxes, removal of chemicals, etc.

### 4.6 Escalation

No allowance for escalation was included in the cost estimate. All costs are determined in 4$^{th}$ Quarter 2015 levels.

### 4.7 Contingency

Allowances were included in the cost estimate as contingency as noted for the following:

- Scrap Value: Included as 15.0% reduction in the salvage value resulting in a total net reduction in the salvage value. The contingency assumes a potential drop in salvage value thus increasing the project cost. Scrap costs are very volatile but by taking a 3-month average some of the effect of volatility is reduced. However there are other variables that affect scrap pricing such as the quantity and processing fees. The contingency applied is based on the estimators confidence in scrap pricing used in the demolition cost estimate.
- Material: Included as 20.0% of the total material cost.
- Labor: Included as 20.0% of the total labor cost.
- Indirect: Included as 20.0% of the total indirect cost.
- Subcontractor: Included as 20.0% of the total subcontractor cost.

### 4.8 Assumptions

The following assumptions apply to the cost estimates.

- The cost estimate for each retirement option is based on the scope and the demolition sequences defined on the sketches provided in Exhibit 4.
- All chemicals will be removed by the Owner prior to demolition, from the facilities to be demolished.

- All electrical equipment and wiring is de-energized prior to start of dismantlement, except for that required for remote operation of tainter gates No. 10 and 11 after demolition is completed for retirement option 1.
- No extraordinary environmental costs for demolition have been included.
- Handling, on-site and off-site disposal of hazardous materials would be performed in compliance with methods approved by Owner.
- The window glazing in the powerhouse may be asbestos contaminated and an allowance for removal and disposal is included in the asbestos removal cost estimate. There are nine (9) control boards mounted on 3' x 9' transite (asbestos) panels and eighteen (18) 4kV breakers mounted in cubicles constructed of transite panels. An allowance for removal and disposal of these transite panels is included in the asbestos removal cost estimate. There is no building or pipe insulation in the facility and consequently no insulation related asbestos contamination.
- Switchyards within the plant boundaries are not part of the scope, neither are access roads to these facilities. Fences and gates needed to protect the switchyard will be left in place.
- All demolished materials are considered debris, except for organic combustibles and non-embedded metals which have scrap value.
- The basis for salvage estimating is for scrap value only. No resale of equipment or material is included.
- Sediment removed due to demolition work is treated with lime and hauled offsite to an approved waste disposal facility.

## 5.0 REFERENCES

**5.1** Elkhart Plant Drawings: One-Line Diagrams, No. 5839-1000-35, Revision 35 and No. 13-12000-1, 6/5/98.

**5.2** American Electric Power, Supporting Technical Information Document, Elkhart Hydroelectric Project, September, 2007.

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# EXHIBIT 1
# Elkhart Hydroelectric Plant
# Conceptual Demolition Cost Estimate Summary

Elkhart Hydroelectric Plant
Indiana Michigan Power Company
American Electric Power Service Corporation
Estimate Number: 33708B



| | Retirement Option 1 | Retirement Option 2 | Retirement Option 3 |
|---|---|---|---|
| Demolition Cost | $ 68,721 | $ 5,182,983 | $ 7,177,344 |
| Scrap Value | $ (42,715) | $ (148,382) | $ (165,008) |
| Direct Cost Subtotal | $ 26,005 | $ 5,034,600 | $ 7,012,335 |
| Indirect Cost | $ 2,000 | $ 515,000 | $ 718,000 |
| Contingency Cost | $ 20,000 | $ 1,161,900 | $ 1,604,000 |
| Escalation Cost | $ - | $ - | $ - |
| Total Demolition Cost | $ 48,005 | $ 6,711,500 | $ 9,334,335 |

# EXHIBIT 2
# Elkhart Hydroelectric Plant
# Conceptual Demolition Cost Estimate No. 33708B

# AEP ELKHART
# HYDROELECTRIC PLANT DISMANTLEMENT STUDY
# CONCEPTUAL COST ESTIMATE

| | |
|---|---|
| **Client** | AEP |
| **Estimator** | RCK |
| **Labor rate table** | 15INSOU |
| **Project No.** | 13465-000 |
| **Station Name** | ELKHART |
| **Unit** | ALL |
| **Estimate Date** | 02/12/2016 |
| **Reviewed By** | ADC |
| **Approved By** | MNO |
| **Estimate No.** | 33708B |
| **Estimate Class** | Conceptual |
| **Cost index** | INSOU |

| Area | Description | Subcontract Cost | Scrap Value | Material Cost | Man Hours | Labor Cost | Total Cost |
|---|---|---|---|---|---|---|---|
| ACCOUNT A | DEMOLITION ACCOUNT A | | (42,715) | | 748 | 68,721 | 26,005 |
| ACCOUNT B | DEMOLITION ACCOUNT B | 663,920 | (105,667) | 2,073,405 | 30,143 | 2,376,937 | 5,008,595 |
| ACCOUNT C | DEMOLITION ACCOUNT C | 617,580 | (16,626) | 25,644 | 15,074 | 1,351,137 | 1,977,735 |
| | TOTAL DIRECT | 1,281,500 | (165,009) | 2,099,049 | 45,964 | 3,796,795 | 7,012,335 |

## Estimate Totals

| Description | Amount | Totals | Hours |
|---|---|---|---|
| **Direct Costs:** | | | |
| Labor | 3,796,795 | | 45,964 |
| Material | 2,099,049 | | |
| Subcontract | 1,281,500 | | |
| Scrap Value | (165,009) | | |
| | **7,012,335** | **7,012,335** | |
| **Other Direct & Construction Indirect Costs:** | | | |
| 91-1 Scaffolding | | | |
| 91-2 Cost Due To OT 5-10's | | | |
| 91-3 Cost Due To OT 6-10's | | | |
| 91-4 Per Diem | | | |
| 91-5 Consumables | | | |
| 91-8 Freight on Material | | | |
| 91-9 Freight on Process Equip | | | |
| 91-10 Sales Tax | | | |
| 91-11 Contractors G&A | | | |
| 91-12 Contractors Profit | | | |
| | | **7,012,335** | |
| **Indirect Costs:** | | | |
| 93-1 Engineering Services | | | |
| 93-2 CM Support | | | |
| 93-3 Start-Up/Commissioning | | | |
| 93-4 Start-Up/Spare Parts | | | |
| 93-5 Excess Liability Insur. | | | |
| 93-6 Sales Tax On Indirects | | | |
| 93-7 Owners Cost | 718,000 | | |
| 93-8 EPC Fee | | | |
| | **718,000** | **7,730,335** | |
| **Contingency:** | | | |
| 94-1 Contingency on Material | 420,000 | | |
| 94-2 Contingency on Labor | 759,000 | | |
| 94-3 Contingency on Sub. | 256,000 | | |
| 94-6 Contingency on Scrap | 25,000 | | |
| 94-5 Contingency on Indirect | 144,000 | | |
| | **1,604,000** | **9,334,335** | |
| **Escalation:** | | | |
| 96-1 Escalation on Material | | | |
| 96-2 Escalation on Labor | | | |
| 96-3 Escalation on Subcontract | | | |
| 96-4 Escalation on Scrap | | | |
| 96-5 Escalation on Indirects | | | |
| | | **9,334,335** | |
| | | **9,334,335** | |
| ***Total*** | | ***9,334,335*** | |

| Area | Group | Phase | Description | Notes | Quantity | Man Hours | Crew Rate | Labor Cost | Material Cost | Subcontract Cost | Scrap Value | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ACCOUNT A | | | DEMOLITION ACCOUNT A | | | | | | | | | |
| | 10.00.00 | | WHOLE PLANT DEMOLITION | | | | | | | | | |
| | | 10.31.00 | MECHANICAL EQUIPMENT | | | | | | | | | |
| | | | DEMO 1.44 MW CAMELBACK GENERATOR | 1 GENERATORS AT 16000# EA | 8.00 TN | 88 | 85.53 /MH | 7,527 | | - | | 7,527 |
| | | | DEMO 1.0 MW CAMELBACK GENERATOR | 2 GENERATORS AT 13000# EA | 13.00 TN | 143 | 85.53 /MH | 12,232 | | - | | 12,232 |
| | | | DEMO SYNC CONDENSER | 1 AT 8000# EA | 4.00 TN | 44 | 85.53 /MH | 3,764 | | - | | 3,764 |
| | | | DEMO 1.44 MW FRANCIS TURBINE AND GEARS | 1 GENERATORS AT 11.8TN EA | 11.80 TN | 130 | 85.53 /MH | 11,103 | | - | | 11,103 |
| | | | DEMO 1.0 MW FRANCIS TURBINE AND GEARS | 2 GENERATORS AT 9.5 EA | 19.00 TN | 209 | 85.53 /MH | 17,878 | | - | | 17,878 |
| | | | TURBINE ROOM 30 TON OVERHEAD CRANE | CRANE IS NOT MOTORIZED | 40.00 TN | 89 | 121.33 /MH | 10,812 | | - | | 10,812 |
| | | | BAR RACKS | 4 AT 5 TONS EACH | 20.00 TN | 45 | 121.33 /MH | 5,406 | | - | | 5,406 |
| | | | MECHANICAL EQUIPMENT | | | 748 | | 68,721 | | | | 68,721 |
| | | | WHOLE PLANT DEMOLITION | | | 748 | | 68,721 | | | | 68,721 |
| | 18.00.00 | | SCRAP VALUE | | | | | | | | | |
| | | 18.10.00 | MIXED STEEL | | | | | | | | | |
| | | | MIXED STEEL | DEMO 1.44 MW CAMELBACK GENERATOR | -8.00 TN | | 79.62 /MH | | - | - | (945) | (945) |
| | | | MIXED STEEL | DEMO 1.0 MW CAMELBACK GENERATOR | -5.80 TN | | 79.62 /MH | | - | - | (685) | (685) |
| | | | MIXED STEEL | DEMO SYNC CONDENSER | -4.00 TN | | 79.62 /MH | | - | - | (472) | (472) |
| | | | MIXED STEEL | DEMO 1.44 MW FRANCIS TURBINE AND GEARS | -11.80 TN | | 79.62 /MH | | - | - | (1,393) | (1,393) |
| | | | MIXED STEEL | DEMO 1.0 MW FRANCIS TURBINE AND GEARS | -19.00 TN | | 79.62 /MH | | - | - | (2,244) | (2,244) |
| | | | MIXED STEEL | TURBINE ROOM 30 TON OVERHEAD CRANE | -40.00 TN | | 79.62 /MH | | - | - | (4,723) | (4,723) |
| | | | MIXED STEEL | BAR RACKS | -20.00 TN | | 79.62 /MH | | - | - | (2,362) | (2,362) |
| | | | MIXED STEEL | | | | | | | | (12,823) | (12,823) |
| | | 18.30.00 | COPPER | | | | | | | | | |
| | | | COPPER | DEMO 1.44 MW CAMELBACK GENERATOR | -3.60 TN | | 79.62 /MH | | - | - | (11,448) | (11,448) |
| | | | COPPER | DEMO 2-1.0 MW CAMELBACK GENERATOR | -5.80 TN | | 79.62 /MH | | - | - | (18,444) | (18,444) |
| | | | COPPER | | | | | | | | (29,892) | (29,892) |
| | | | SCRAP VALUE | | | | | | | | (42,715) | (42,715) |
| | | | ACCOUNT A DEMOLITION ACCOUNT A | | | 748 | | 68,721 | | | (42,715) | 26,005 |
| ACCOUNT B | | | DEMOLITION ACCOUNT B | | | | | | | | | |
| | 10.00.00 | | WHOLE PLANT DEMOLITION | | | | | | | | | |
| | | 10.22.00 | CONCRETE | | | | | | | | | |
| | | | EQUIPMENT/ BUILDING FOUNDATION | TAINTER GATE - TOP PORTION: WEIR, GATE WALLS & HEAD WALL | 6,720.00 CY | 8,317 | 89.94 /MH | 748,016 | | - | - | 748,016 |
| | | | CONCRETE | | | 8,317 | | 748,016 | | | | 748,016 |
| | | 10.23.00 | STEEL | | | | | | | | | |
| | | | STRUCTURAL AND GIRT STEEL | TAINTER GATES STRUCTURE AND WALKWAY | 33.00 TN | 37 | 79.62 /MH | 2,937 | | - | - | 2,937 |
| | | | STEEL | | | 37 | | 2,937 | | | | 2,937 |
| | | 10.31.00 | MECHANICAL EQUIPMENT | | | | | | | | | |
| | | | 60 KW PROPANE ELECTRIC GENERATOR | | 1.50 TN | 3 | 121.33 /MH | 405 | | - | | 405 |
| | | | TAINTER GATES | 11 AT 5 TONS EACH | 55.00 TN | 123 | 121.33 /MH | 14,866 | | - | | 14,866 |
| | | | TAINTER HEADGATES | 4 AT 5 TONS EACH | 20.00 TN | 45 | 121.33 /MH | 5,406 | | - | | 5,406 |
| | | | MECHANICAL EQUIPMENT | | | 170 | | 20,677 | | | | 20,677 |
| | | 10.41.00 | ELECTRICAL EQUIPMENT | | | | | | | | | |
| | | | GENERATOR BUS TRANSFORMERS | 4.16 to 34.5 KV, 1500KVA (STEEL) | 6.00 TN | 18 | 80.14 /MH | 1,413 | | - | - | 1,413 |
| | | | GENERATOR BUS TRANSFORMERS | 4.16 to 34.5 KV, 1500 KVA (CU) | 3.00 TN | 9 | 80.14 /MH | 707 | | - | - | 707 |
| | | | GENERATOR BUS TRANSFORMERS | 4.16 to 34.5 KV, 2500KVA (STEEL) | 7.25 TN | 21 | 80.14 /MH | 1,708 | | - | - | 1,708 |
| | | | GENERATOR BUS TRANSFORMERS | 4.16 to 34.5 KV, 2500 KVA (CU) | 4.90 TN | 14 | 80.14 /MH | 1,154 | | - | - | 1,154 |
| | | | GENERATOR BUS TRANSFORMERS | AUTO TRANSFORMER 27/33 KV, 7500KVA (STEEL) | 9.60 TN | 28 | 80.14 /MH | 2,261 | | - | - | 2,261 |
| | | | GENERATOR BUS TRANSFORMERS | AUTO TRANSFORMER 27/33 KV, 7500KVA (CU) | 4.60 TN | 14 | 80.14 /MH | 1,084 | | - | - | 1,084 |
| | | | MISCELLANEOUS ELECTRICAL EQUIPMENT | | 8.00 TN | 24 | 80.14 /MH | 1,885 | | - | - | 1,885 |
| | | | ELECTRICAL EQUIPMENT | | | 127 | | 10,212 | | | | 10,212 |
| | | | WHOLE PLANT DEMOLITION | | | 8,652 | | 781,842 | | | | 781,842 |
| | 18.00.00 | | SCRAP VALUE | | | | | | | | | |
| | | 18.10.00 | MIXED STEEL | | | | | | | | | |
| | | | MIXED STEEL | 60 KW PROPANE ELECTRIC GENERATOR | -1.50 TN | | 79.62 /MH | | - | - | (177) | (177) |
| | | | MIXED STEEL | TAINTER GATES | -55.00 TN | | 79.62 /MH | | - | - | (6,494) | (6,494) |

| Area | Group | Phase | Description | Notes | Quantity | Man Hours | Crew Rate | Labor Cost | Material Cost | Subcontract Cost | Scrap Value | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 18.10.00 | MIXED STEEL | | | | | | | | | |
| | | | MIXED STEEL | TAINTER HEADGATES | -20.00 TN | | 79.62 /MH | | - | - | (2,362) | (2,362) |
| | | | MIXED STEEL | 4.16 to 34.5 KV, 1500KVA (STEEL) | -6.00 TN | | 79.62 /MH | | - | - | (708) | (708) |
| | | | MIXED STEEL | 4.16 to 34.5 KV, 2500KVA (STEEL) | -7.25 TN | | 79.62 /MH | | - | - | (856) | (856) |
| | | | MIXED STEEL | AUTO TRANSFORMER 27/33 KV, 7500KVA (STEEL) | -4.60 TN | | 79.62 /MH | | - | - | (543) | (543) |
| | | | MIXED STEEL | TAINTER GATES STRUCTURE AND WALKWAY | -33.00 TN | | 79.62 /MH | | - | - | (3,897) | (3,897) |
| | | | MIXED STEEL | | | | | | | | (15,037) | (15,037) |
| | | 18.30.00 | COPPER | | | | | | | | | |
| | | | COPPER | CABLE | -10.00 TN | | 79.62 /MH | | - | - | (31,800) | (31,800) |
| | | | COPPER | MISC. TRANSFORMERS & MOTORS UNIT 1 | -6.00 TN | | 79.62 /MH | | - | - | (19,080) | (19,080) |
| | | | COPPER | 4.16 to 34.5 KV, 1500 KVA (CU) | -3.00 TN | | 79.62 /MH | | - | - | (9,540) | (9,540) |
| | | | COPPER | 4.16 to 34.5 KV, 2500 KVA (CU) | -4.90 TN | | 79.62 /MH | | - | - | (15,582) | (15,582) |
| | | | COPPER | AUTO TRANSFORMER 27/33 KV, 7500KVA (CU) | -4.60 TN | | 79.62 /MH | | - | - | (14,628) | (14,628) |
| | | | COPPER | | | | | | | | (90,630) | (90,630) |
| | | | SCRAP VALUE | | | | | | | | (105,667) | (105,667) |
| | 21.00.00 | | CIVIL WORK | | | | | | | | | |
| | | 21.17.00 | EXCAVATION | | | | | | | | | |
| | | | FOUNDATION EXCAVATION, CLAY USING 1 CY BACKHOE | RIVERBED EXCAVATION FOR RIPRAP | 115.00 CY | 22 | 88.08 /MH | 1,894 | | - | - | 1,894 |
| | | | EXCAVATION | | | 22 | | 1,894 | | | | 1,894 |
| | | 21.41.00 | Erosion and Sedimentation Control | | | | | | | | | |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | FOR CAUSEWAYS INSTALLATION | 9,778.00 CY | 4,314 | 74.10 /MH | 319,631 | 399,920 | - | - | 719,551 |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | NEW STONE REQD IF CAUSEWAY STONE IS REUSED (39420-9778) | 29,642.00 CY | 9,682 | 74.10 /MH | 717,418 | 1,212,358 | - | - | 1,929,775 |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | RELOCATE CAUSE WAY STONE FOR RIVER BEND PR0TECTION | 9,778.00 CY | 3,194 | 74.10 /MH | 236,654 | | - | - | 236,654 |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | RIP RAP PROTECTION AT FLOOR SLABS TO REMAIN IN PLACE | 115.00 CY | 38 | 74.10 /MH | 2,783 | 4,704 | - | - | 7,487 |
| | | | Erosion and Sedimentation Control | | | 17,227 | | 1,276,486 | 1,616,982 | | | 2,893,468 |
| | | 21.47.00 | LANDSCAPING | | | | | | | | | |
| | | | HYDRO OR AIR SEED & MULCH & FERTILIZER | RIVERBAND STABILIZATIION | 299.00 AC | 4,243 | 74.64 /MH | 316,715 | 456,424 | - | - | 773,139 |
| | | | LANDSCAPING | | | 4,243 | | 316,715 | 456,424 | | | 773,139 |
| | | 21.65.00 | Soil Remediation | | | | | | | | | |
| | | | REMOVAL OF LOCALIZED SILT AT DAM | LIME ADDITIVE FOR DRYING | 2,639.00 CY | | 196.64 /MH | | | 105,560 | - | 105,560 |
| | | | REMOVAL OF LOCALIZED SILT AT DAM | LOAD, MIX AND HAUL LIME AND SEDIMENT MIX (5278+2639) | 7,917.00 CY | | 196.64 /MH | | | 475,020 | - | 475,020 |
| | | | REMOVAL OF LOCALIZED SILT AT HEADGATE | LOAD, MIX AND HAUL LIME AND SEDIMENT MIX 926+463 | 1,389.00 CY | | 196.64 /MH | | | 83,340 | - | 83,340 |
| | | | Soil Remediation | | | | | | | 663,920 | | 663,920 |
| | | | CIVIL WORK | | | 21,491 | | 1,595,096 | 2,073,405 | 663,920 | | 4,332,421 |
| | | | **ACCOUNT B DEMOLITION ACCOUNT B** | | | **30,143** | | **2,376,937** | **2,073,405** | **663,920** | **(105,667)** | **5,008,595** |
| **ACCOUNT C** | | | **DEMOLITION ACCOUNT C** | | | | | | | | | |
| | 10.00.00 | | WHOLE PLANT DEMOLITION | | | | | | | | | |
| | | 10.22.00 | CONCRETE | | | | | | | | | |
| | | | EQUIPMENT/ BUILDING FOUNDATION | TAINTER GATE - BOTTOM PORTION : APRON AND THROAT | 3,580.00 CY | 4,431 | 89.94 /MH | 398,497 | | - | - | 398,497 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | GENERATOR HOUSE | 6,582.00 CY | 8,146 | 89.94 /MH | 732,655 | | - | - | 732,655 |
| | | | CONCRETE | | | 12,577 | | 1,131,151 | | | | 1,131,151 |
| | | 10.23.00 | STEEL | | | | | | | | | |
| | | | STRUCTURAL AND GIRT STEEL | GENERATOR HOUSE | 111.80 TN | 125 | 79.62 /MH | 9,949 | | - | - | 9,949 |
| | | | STEEL | | | 125 | | 9,949 | | | | 9,949 |
| | | 10.24.00 | ARCHITECTURAL | | | | | | | | | |
| | | | GENERATOR HOUSE | TALL | 447,520.00 CF | 1,920 | 89.81 /MH | 172,440 | | - | - | 172,440 |
| | | | ARCHITECTURAL | | | 1,920 | | 172,440 | | | | 172,440 |
| | | 10.31.00 | MECHANICAL EQUIPMENT | | | | | | | | | |
| | | | DEMO 1.44 MW PENSTOCKS | 1 AT 20000# EA | 10.00 TN | 110 | 85.53 /MH | 9,409 | | - | | 9,409 |
| | | | DEMO 1.00 MW PENSTOCKS | 2 GENERATORS AT 8 TN EA | 16.00 TN | 176 | 85.53 /MH | 15,055 | | - | | 15,055 |

| Area | Group | Phase | Description | Notes | Quantity | Man Hours | Crew Rate | Labor Cost | Material Cost | Subcontract Cost | Scrap Value | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MECHANICAL EQUIPMENT | | | 286 | | 24,464 | | | | 24,464 |
| | | 10.86.00 | WASTE | | | | | | | | | |
| | | | WASTE - USER DEFINED | MISC | 1.00 LS | 0 | 121.33 /MH | 13 | | 10,000 | | 10,013 |
| | | | WASTE | | | 0 | | 13 | | 10,000 | | 10,013 |
| | | | WHOLE PLANT DEMOLITION | | | 14,908 | | 1,338,018 | | 10,000 | | 1,348,018 |
| | 18.00.00 | | SCRAP VALUE | | | | | | | | | |
| | | 18.10.00 | MIXED STEEL | | | | | | | | | |
| | | | MIXED STEEL | DEMO 1.44 MW PENSTOCKS | -10.00 TN | | 79.62 /MH | | - | - | (1,181) | (1,181) |
| | | | MIXED STEEL | DEMO 1.00 MW PENSTOCKS | -19.00 TN | | 79.62 /MH | | - | - | (2,244) | (2,244) |
| | | | MIXED STEEL | GENERATOR HOUSE | -111.80 TN | | 79.62 /MH | | - | - | (13,201) | (13,201) |
| | | | MIXED STEEL | | | | | | | | (16,626) | (16,626) |
| | | | SCRAP VALUE | | | | | | | | (16,626) | (16,626) |
| | 21.00.00 | | CIVIL WORK | | | | | | | | | |
| | | 21.17.00 | EXCAVATION | | | | | | | | | |
| | | | FOUNDATION EXCAVATION, CLAY USING 1 CY BACKHOE | EARTHWORK CUT AT DAM ABUTMENTS (330-115) | 215.00 CY | 40 | 88.08 /MH | 3,542 | | - | - | 3,542 |
| | | | EXCAVATION | | | 40 | | 3,542 | | | | 3,542 |
| | | 21.41.00 | Erosion and Sedimentation Control | | | | | | | | | |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | RIP RAP PROTECTION AT ABUTMENTS TO REMAIN IN PLACE (395-115) | 280.00 CY | 91 | 74.10 /MH | 6,777 | 11,452 | - | - | 18,229 |
| | | | Erosion and Sedimentation Control | | | 91 | | 6,777 | 11,452 | | | 18,229 |
| | | 21.47.00 | LANDSCAPING | | | | | | | | | |
| | | | HYDRO OR AIR SEED & MULCH & FERTILIZER | CREDIT (299-290) | -9.00 AC | -128 | 74.64 /MH | (9,533) | (13,738) | - | - | (23,272) |
| | | | LANDSCAPING | | | -128 | | (9,533) | (13,738) | | | (23,272) |
| | | 21.65.00 | Soil Remediation | | | | | | | | | |
| | | | REMOVAL OF LOCALIZED SILT AT DAM | LIME ADDITIVE FOR DRYING (5278-2639) | 2,639.00 CY | | 196.64 /MH | | | 105,560 | - | 105,560 |
| | | | REMOVAL OF LOCALIZED SILT AT DAM | LOAD, MIX AND HAUL LIME AND SEDIMENT MIX CREDIT 16284-7917) | 8,367.00 CY | | 196.64 /MH | | | 502,020 | - | 502,020 |
| | | | Soil Remediation | | | | | | | 607,580 | | 607,580 |
| | | | CIVIL WORK | | | 4 | | 785 | (2,286) | 607,580 | | 606,079 |
| | 22.00.00 | | CONCRETE | | | | | | | | | |
| | | 22.13.00 | Concrete | | | | | | | | | |
| | | | FLOWABLE FILL, 1500 PSI | FILL PENSTOCKS TO PREVENT BYPASS FLOW | 294.00 CY | 162 | 76.27 /MH | 12,334 | 27,930 | - | - | 40,264 |
| | | | Concrete | | | 162 | | 12,334 | 27,930 | | | 40,264 |
| | | | CONCRETE | | | 162 | | 12,334 | 27,930 | | | 40,264 |
| | | | **ACCOUNT C DEMOLITION ACCOUNT C** | | | **15,074** | | **1,351,137** | **25,644** | **617,580** | **(16,626)** | **1,977,735** |

# EXHIBIT 3
# Elkhart Hydroelectric Plant
# Asbestos Removal Conceptual Cost Estimate No. 33740B

# AEP ELKHART
# HYDROELECTRIC PLANT DISMANTLEMENT STUDY - ASBESTOS REMOVAL
# CONCEPTUAL COST ESTIMATE

| | |
|---|---|
| **Client** | AEP |
| **Estimator** | RCK |
| **Labor rate table** | 15INSOU |
| **Project No.** | 13465-000 |
| **Station Name** | ELKHART |
| **Unit** | ALL |
| **Estimate Date** | 02/12/2016 |
| **Reviewed By** | ADC |
| **Approved By** | MNO |
| **Estimate No.** | 33740B |
| **Estimate Class** | Conceptual |
| **Cost index** | INSOU |

**AEP ELKHART**
**HYDROELECTRIC PLANT DISMANTLEMENT STUDY - ASBESTOS REMOVAL**
**CONCEPTUAL COST ESTIMATE**



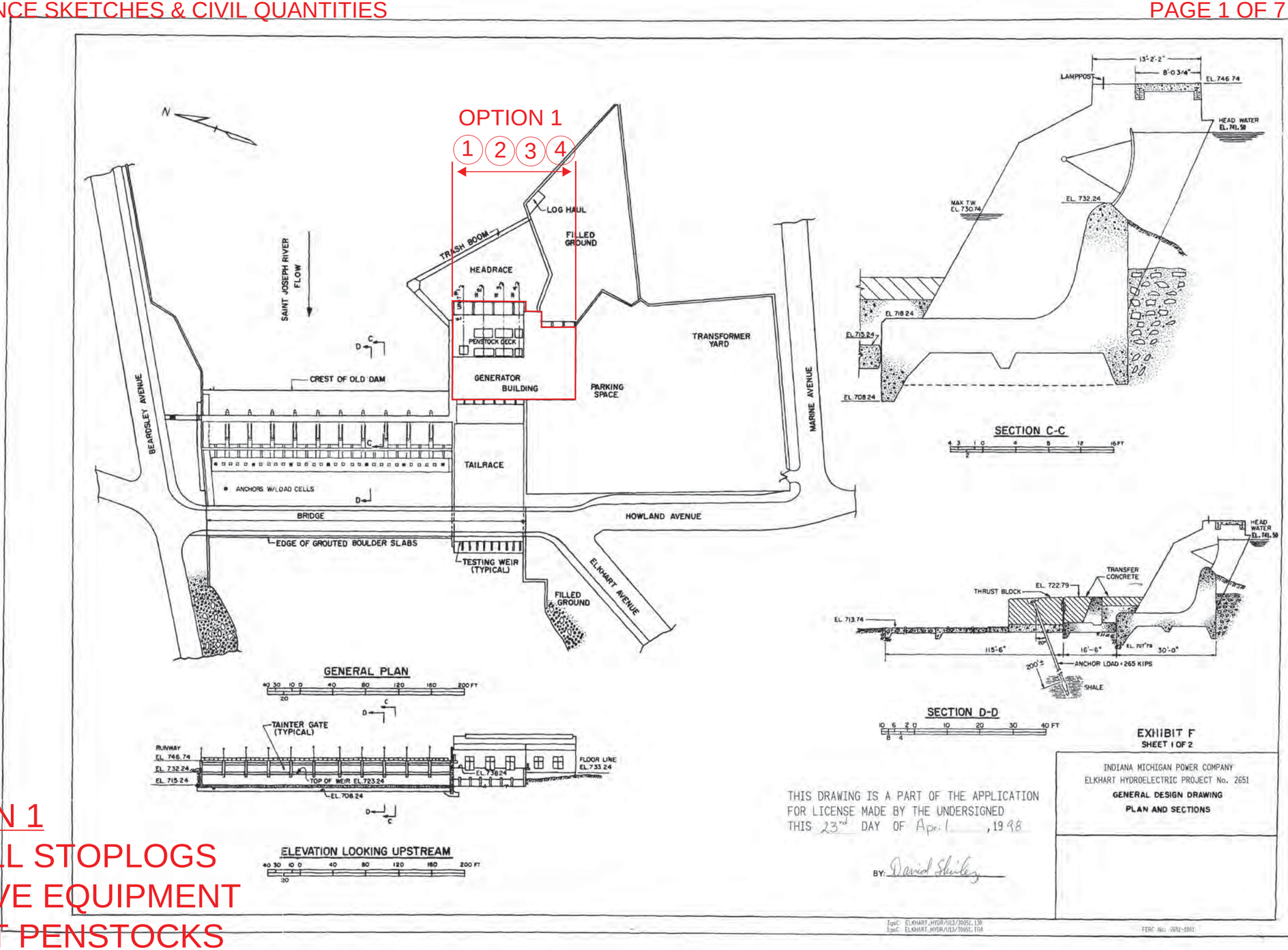
| Area | Description | Subcontract Cost | Scrap Value | Material Cost | Man Hours | Labor Cost | Total Cost |
|---|---|---|---|---|---|---|---|
| ASBESTOS | ASBESTOS REMOVAL | 275,500 | | | | | 275,500 |
| | TOTAL DIRECT | 275,500 | | | | | 275,500 |

## Estimate Totals

| Description | Amount | Totals | Hours |
|---|---|---|---|
| **Direct Costs:** | | | |
| Labor | | | |
| Material | | | |
| Subcontract | 275,500 | | |
| Scrap Value | | | |
| | **275,500** | **275,500** | |
| **Other Direct & Construction** | | | |
| **Indirect Costs:** | | | |
| 91-1 Scaffolding | | | |
| 91-2 Cost Due To OT 5-10's | | | |
| 91-3 Cost Due To OT 6-10's | | | |
| 91-4 Per Diem | | | |
| 91-5 Consumables | | | |
| 91-8 Freight on Material | | | |
| 91-9 Freight on Process Equip | | | |
| 91-10 Sales Tax | | | |
| 91-11 Contractors G&A | | | |
| 91-12 Contractors Profit | | | |
| | | **275,500** | |
| **Indirect Costs:** | | | |
| 93-1 Engineering Services | | | |
| 93-2 CM Support | | | |
| 93-3 Start-Up/Commissioning | | | |
| 93-4 Start-Up/Spare Parts | | | |
| 93-5 Excess Liability Insur. | | | |
| 93-6 Sales Tax On Indirects | | | |
| 93-7 Owners Cost | 27,550 | | |
| 93-8 EPC Fee | | | |
| | **27,550** | **303,050** | |
| **Contingency:** | | | |
| 94-1 Contingency on Material | | | |
| 94-2 Contingency on Labor | | | |
| 94-3 Contingency on Sub. | 55,100 | | |
| 94-6 Contingency on Scrap | | | |
| 94-5 Contingency on Indirect | 5,510 | | |
| | **60,610** | **363,660** | |
| **Escalation:** | | | |
| 96-1 Escalation on Material | | | |
| 96-2 Escalation on Labor | | | |
| 96-3 Escalation on Subcontract | | | |
| 96-4 Escalation on Scrap | | | |
| 96-5 Escalation on Indirects | | | |
| | | **363,660** | |
| | | **363,660** | |
| ***Total*** | | ***363,660*** | |

| Area | Group | Phase | Description | Notes | Quantity | Man Hours | Crew Rate | Labor Cost | Material Cost | Subcontract Cost | Scrap Value | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ASBESTOS | | | ASBESTOS REMOVAL | | | | | | | | | |
| | 10.00.00 | | WHOLE PLANT DEMOLITION | | | | | | | | | |
| | | 10.37.00 | ASBESTOS REMOVAL | | | | | | | | | |
| | | | ASBESTOS REMOVAL - MISC MATERIALS | WINDOW CAULKING MISC MATERIALS | 2.00 CY | | 121.33 /MH | | | 3,800 | - | 3,800 |
| | | | ASBESTOS REMOVAL - 4 KV CUBICLES | 18-4 KV CUBICLES | 134.00 CY | | 121.33 /MH | | | 254,600 | - | 254,600 |
| | | | ASBESTOS REMOVAL - 9 - CONTROL AND INSTRUMENT PANELS | 9 PANELS 3'X1'X9' | 9.00 CY | | 121.33 /MH | | | 17,100 | - | 17,100 |
| | | | ASBESTOS REMOVAL | | | | | | | 275,500 | | 275,500 |
| | | | WHOLE PLANT DEMOLITION | | | | | | | 275,500 | | 275,500 |
| | | | ASBESTOS ASBESTOS REMOVAL | | | | | | | 275,500 | | 275,500 |

# EXHIBIT 4
# Elkhart Hydroelectric Plant
# Retirement Option 1-3 Demolition Scope and Sequence

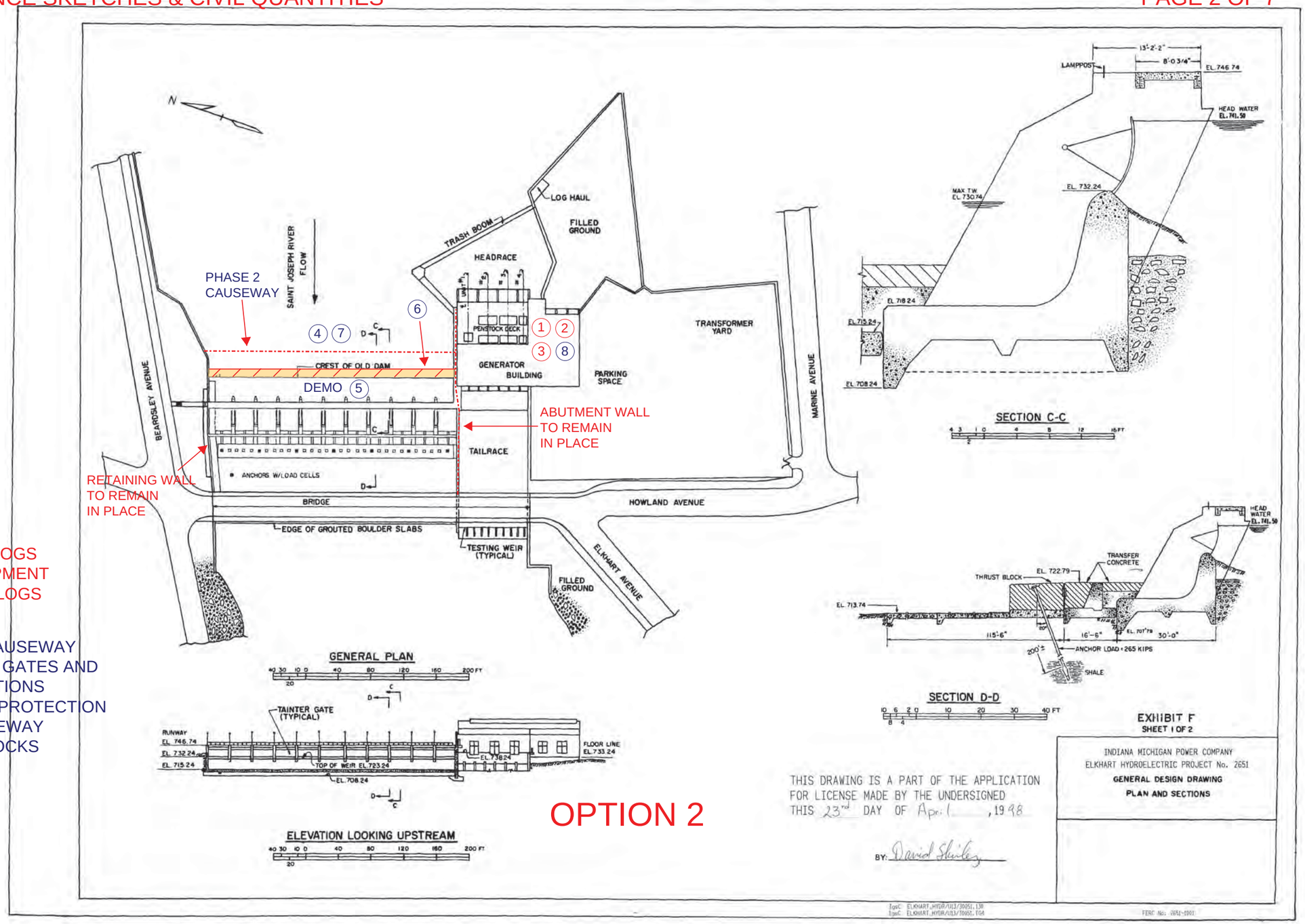



OPTION 1

1. INSTALL STOPLOGS
2. REMOVE EQUIPMENT
3. GROUT PENSTOCKS
4. REMOVE STOPLOGS

PHASE 1
1. INSTALL STOPLOGS
2. REMOVE EQUIPMENT
3. REMOVE STOPLOGS

PHASE 2
4. CONSTRUCT CAUSEWAY
5. DEMO TAINTER GATES AND SPILLWAY SECTIONS
6. PLACE RIPRAP PROTECTION
7. REMOVE CAUSEWAY
8. GROUT PENSTOCKS




OPTION 2

EXHIBIT F
SHEET 1 OF 2

INDIANA MICHIGAN POWER COMPANY
ELKHART HYDROELECTRIC PROJECT No. 2651
**GENERAL DESIGN DRAWING**
**PLAN AND SECTIONS**

THIS DRAWING IS A PART OF THE APPLICATION FOR LICENSE MADE BY THE UNDERSIGNED THIS 23rd DAY OF April, 1998

BY: David Shirley

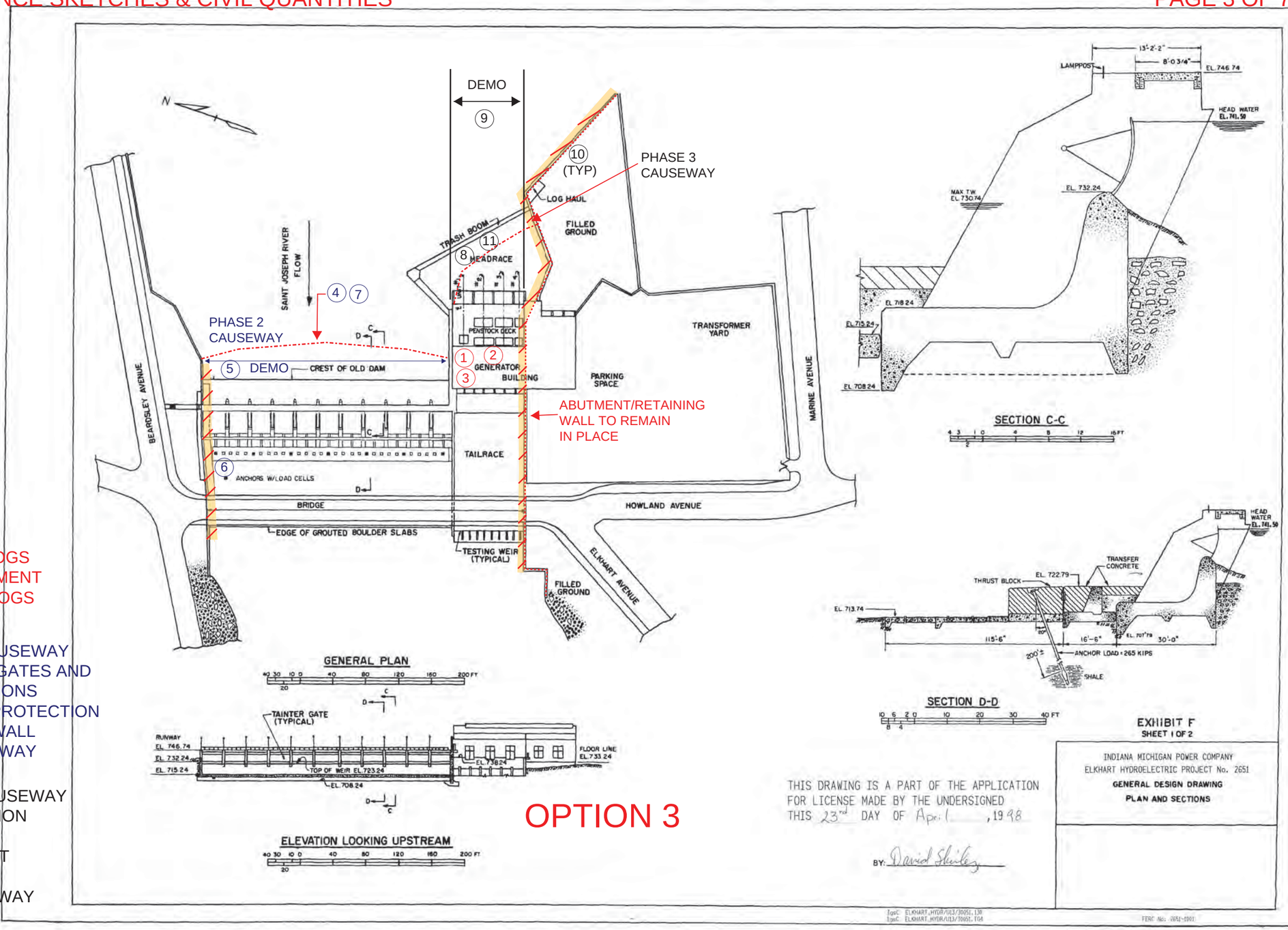
IgsC ELKHART_HYDR/UL3/39051.130
IgsC ELKHART_HYDR/UL3/39051.TG4

FERC No. 2651-1001

PHASE 1
1. INSTALL STOPLOGS
2. REMOVE EQUIPMENT
3. REMOVE STOPLOGS

PHASE 2
4. CONSTRUCT CAUSEWAY
5. DEMO TAINTER GATES AND SPILLWAY SECTIONS
6. PLACE RIPRAP PROTECTION AT RETAIINING WALL
7. REMOVE CAUSEWAY

PHASE 3
8. CONSTRUCT CAUSEWAY
9. DEMO GENERATION BUILDING
10. PLACE RIPRAP AT ABUTMENT
11. REMOVE CAUSEWAY



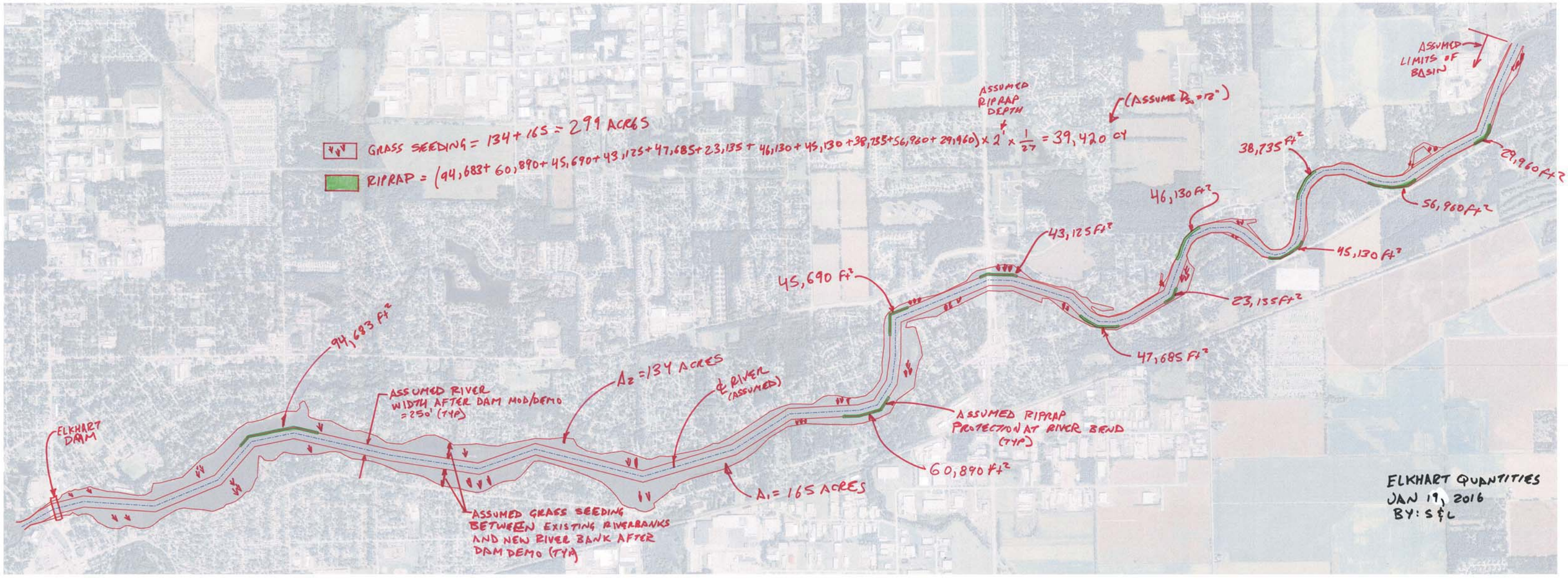

OPTION 3

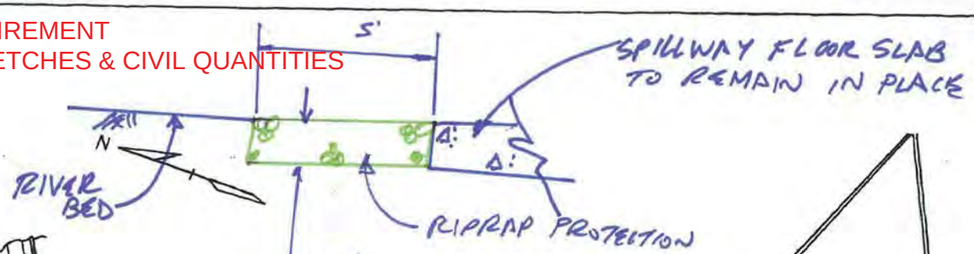
| ELKHART | | | |
|---|---|---|---|
| OPTION 2 | | | |
| ITEM | QUANTITY | UNIT | REMARKS |
| GRASS SEEDING | 299 | ACRE | |
| RIPRAP PROTECTION | 39,420 | CY | 2 ft riprap protection @ D(50)=12" |
| RIVERBED EXCAVATION FOR RIPRAP | 115 | CY | TO BE REPLACED BY RIPRAP |
| RIPRAP PROTECTION AT SPILLWAY FLOOR SLAB | 115 | CY | 2 ft riprap protection @ D(50)=12" |

| OPTION 3 | | | |
|---|---|---|---|
| ITEM | QUANTITY | UNIT | REMARKS |
| GRASS SEEDING | 290 | ACRE | |
| RIPRAP PROTECTION AT RIVER BENDS | 39,420 | CY | 2 ft riprap protection @ D(50)=12" |
| RIPRAP PROTECTION AT DAM ABUTMENTS | 395 | CY | 2 ft riprap protection @ D(50)=12" |
| EARTHWORK CUT AT DAM ABUTMENTS | 330 | CY | Riverbed removal for riprap placement |

Note: Localized miscellaneous silt removal and earthwork as part of dam demolition by Brandenburg

Indiana Michigan Power Company
Attachment JAC-3
Witness; Cash
Page 135 of 205

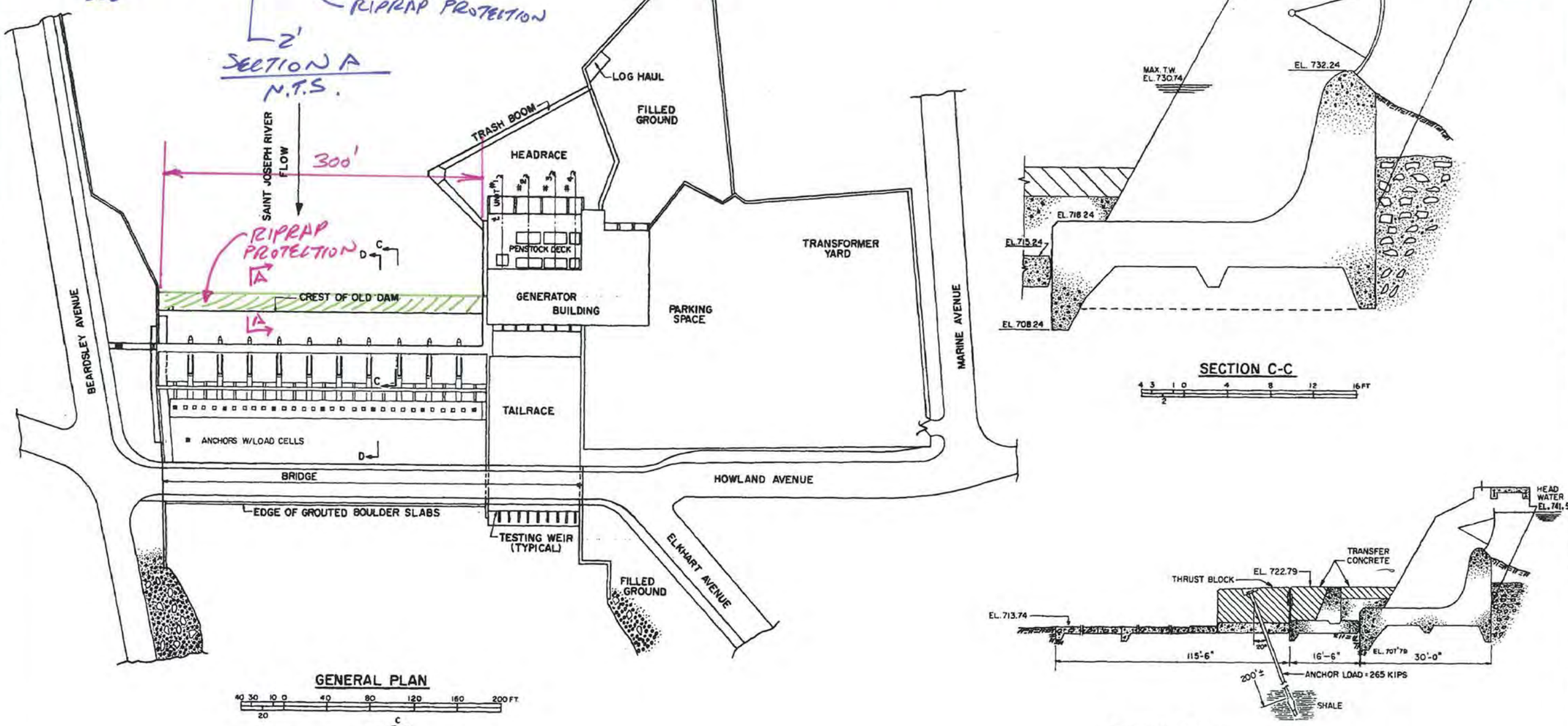




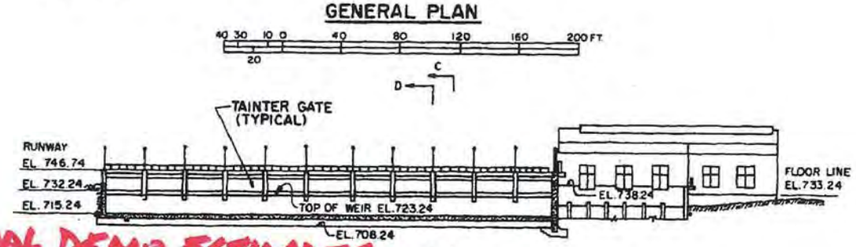

SECTION A
N.T.S.

$V_{RIPRAP} = (2 \times 5)(300)\left(\frac{1}{27}\right) \simeq 115\ CY$

$V_{CUT} = V_{RIPRAP} \simeq 115\ CY$




GENERAL PLAN




ELEVATION LOOKING UPSTREAM




SECTION C-C




SECTION D-D

EXHIBIT F
SHEET 1 OF 2

INDIANA MICHIGAN POWER COMPANY
ELKHART HYDROELECTRIC PROJECT No. 2651
**GENERAL DESIGN DRAWING**
**PLAN AND SECTIONS**

THIS DRAWING IS A PART OF THE APPLICATION FOR LICENSE MADE BY THE UNDERSIGNED THIS 23rd DAY OF April, 1998

BY: David Shirley

1 EM CONCEPTUAL DEMO ESTIMATE
ELKHART RETIREMENT OPTION 2
CIVIL QUANTITIES

IgsC ELKHART_HYDR/U13/30051.130
IgsC ELKHART_HYDR/U13/30051.TG4

FERC No. 2651-1001

RETAINING WALL TO REMAIN IN PLACE

RIPRAP PROTECTION (TYP)

640'

240'

N

SAINT JOSEPH RIVER FLOW

LOG HAUL

TRASH BOOM

FILLED GROUND

HEADRACE

PENSTOCK DECK

GENERATOR BUILDING

TRANSFORMER YARD

PARKING SPACE

CREST OF OLD DAM

TAILRACE

ANCHORS W/LOAD CELLS

BRIDGE

EDGE OF GROUTED BOULDER SLABS

TESTING WEIR (TYPICAL)

FILLED GROUND

BEARDSLEY AVENUE

MARINE AVENUE

HOWLAND AVENUE

ELKHART AVENUE

GENERAL PLAN

40 30 10 0 40 80 120 160 200 FT

20

TAINTER GATE (TYPICAL)

RUNWAY EL. 746.74

EL. 732.24

EL. 715.24

TOP OF WEIR EL. 723.24

EL. 708.24

EL. 738.24

FLOOR LINE EL. 733.24

ELEVATION LOOKING UPSTREAM

40 30 10 0 40 80 120 160 200 FT

20

IF M CONCEPTUAL DEMO ESTIMATE
ELKHART RETIREMENT OPTION 3
CIVIL QUANTITIES

2'

3'

2'

2'

RIPRAP PROTECTION

RIVER BED

SECTION A
@ T.S.

$V_{RIPRAP} = (12)(640+240) \times \left(\frac{1}{27}\right) \approx 395$ CY

$V_{CUT} = (10)(640+240)\left(\frac{1}{27}\right) \approx 330$ CY

LAMPPOST

13'-2 1/2"

8'-03/4"

EL. 746.74

HEAD WATER EL. 741.50

MAX. T.W. EL. 730.74

EL. 732.24

EL. 718.24

EL. 713.24

EL. 708.24

SECTION C-C

4 3 2 1 0 4 8 12 16 FT

HEAD WATER EL. 741.50

TRANSFER CONCRETE

THRUST BLOCK

EL. 722.79

EL. 713.74

115'-6"

16'-6"

EL. 707.79

30'-0"

200'±

ANCHOR LOAD = 265 KIPS

SHALE

SECTION D-D

10 6 2 0 10 20 30 40 FT

8 4

EXHIBIT F
SHEET 1 OF 2

THIS DRAWING IS A PART OF THE APPLICATION FOR LICENSE MADE BY THE UNDERSIGNED THIS 23rd DAY OF April, 1998

BY: David Shirley

INDIANA MICHIGAN POWER COMPANY
ELKHART HYDROELECTRIC PROJECT No. 2651
**GENERAL DESIGN DRAWING**
**PLAN AND SECTIONS**

IgsC ELKHART_HYDR/U13/30051.130
IgsC ELKHART_HYDR/U13/30051.TG4

FERC No. 2651-1001

Mottville Hydroelectric Plant

# CONCEPTUAL DEMOLITION COST ESTIMATE

Prepared for:
Indiana Michigan Power Company (Owner)
and American Electric Power Service Corporation

Project No. 13465-000
February 12, 2016
Revision 0

55 East Monroe Street
Chicago, IL 60603-5780 USA

# Issue Summary Page

| Revision Number | Date | Purpose | Prepared By | Reviewed By | Approved By | Pages Affected |
|---|---|---|---|---|---|---|
| A | 02/02/16 | Comments | R. C. Kinsinger | A.D. Chapin<br>D. F. Franczak | M. N. Ozan | All |
| 0 | 02/12/16 | Use | R. C. Kinsinger<br>RKinsinger<br>AC | A.D. Chapin<br>AChapin<br>D. F. Franczak<br>D. F. Franczak | T. J. Meehan | All |

## TABLE OF CONTENTS

## 1.0 INTRODUCTION

The Mottville Hydroelectric Plant located in the City of Mottville, Michigan is owned and operated by Indiana Michigan Power Company (I&M), a subsidiary of American Electric Power (AEP). The plant consists of (from right to left referenced facing downstream) an earth embankment right of the powerhouse, an integral intake and powerhouse, a gated reinforced concrete spillway and an earth embankment to the left of the spillway. An abandoned fish ladder, separate the powerhouse and spillway. The spillway is equipped with ten (10) tainter gates which regulate headwater. The combined intake-powerhouse is situated to the right of the spillway. The powerhouse contains four (4) vertical shaft operating Allis-Chalmers turbine generators. Each unit is rated at 0.42 MW and were installed in 1923.

AEP recently contracted S&L to prepare conceptual demolition cost estimates considering three (3) retirement options defined as follows: (1) Option 1, Non-Power Operation, (2) Option 2, Partial Removal of the Dam Structures, and (3) Option 3, Complete Removal of the Dam and Powerhouse. Also, in addition S&L was requested to prepare a separate Asbestos Removal Conceptual Cost Estimate.

The objective of the conceptual demolition cost estimates is to determine the gross demolition costs for Mottville Hydroelectric Plant (including gross salvage credits and any other benefits), in support of documenting a component of future AEP book depreciation rates to be approved by the I&M's state commissions and potential future inclusion in submittal of a rate case to the state commissions, and other potential uses. The cost estimate considers the demolition/dismantlement methodology which complies with current OSHA rules and regulations.

## 2.0 COST ESTIMATE SUMMARY

Conceptual Demolition Cost Estimate No. 33709B, dated February 12, 2016, was prepared and is included as Exhibit 2. This cost estimate was prepared for retirement option 3, but includes accounts allowing the determination of cost estimates for retirement options 1 and 2 as well. A summary of the conceptual demolition cost estimates for all three (3) retirement options is provided in Exhibit 1 and detailed in the following tables.

The cost estimate is structured into a code of accounts as identified in Table 2-1.

**Table 2-1**
**Cost Estimate Code of Accounts**

| Account Number | Description |
|---|---|
| 10, 21, 22 | Demolition Costs (including steel, equipment & piping scrap value) |
| 18 | Scrap Value Costs |
| 91 | Other Direct & Construction Indirect Costs |
| 93 | Indirect Costs |
| 94 | Contingency Costs |
| 96 | Escalation Costs |

The results of the cost estimate for retirement option 3 are provided in Table 2-2 below.

**Table 2-2**
**Cost Estimate Results Summary**
**Retirement Option 3**

| Description | Total Cost |
|---|---|
| Demolition Cost | $4,889,193 |
| Scrap Value | ($85,278) |
| Direct Cost Subtotal | $4,803,914 |
| Indirect Cost | $489,000 |
| Contingency Cost | $1,089,000 |
| Escalation Cost | $0 |
| Total Project Cost | $6,381,915 |

The results of the cost estimate for retirement option 1 are provided in Table 2-3 below.

**Table 2-3**
**Cost Estimate Results Summary**
**Retirement Option 1**

| Description | Total Cost |
|---|---|
| Demolition Cost | $65,833 |
| Scrap Value | ($28,733) |
| Direct Cost Subtotal | $37,100 |
| Indirect Cost | $4,000 |
| Contingency Cost | $18,200 |
| Escalation Cost | $0 |
| Total Project Cost | $59,300 |

The results of the cost estimate for retirement option 2 are provided in Table 2-4 below.

**Table 2-4**
**Cost Estimate Results Summary**
**Retirement Option 2**

| Description | Total Cost |
|---|---|
| Demolition Cost | $4,337,930 |
| Scrap Value | ($34,814) |
| Direct Cost Subtotal | $4,303,116 |
| Indirect Cost | $438,000 |
| Contingency Cost | $961,000 |
| Escalation Cost | $0 |
| Total Project Cost | $5,702,116 |

Asbestos Removal Conceptual Cost Estimate No. 33741B, dated February 12, 2016, was prepared and is included as Exhibit 3. The total estimated cost for asbestos removal prior to plant dismantlement is $5,100. Quantities were derived from drawings and past experience. Asbestos removal applies to the powerhouse, thus the removal cost applies to all three (3) retirement options. The cost of asbestos removal is excluded from the total conceptual demolition cost estimates for each retirement option detailed in the tables above.

## 3.0 TECHNICAL BASIS

The scope of dismantlement is based on three (3) retirement options, as requested by AEP, as follows:

Retirement Option 1, Non-Power Operation: This scenario would consider leaving intact all of the existing water-impounding structures and the powerhouse. Only the electric generating units and their auxiliary equipment would be removed so as to preclude the generation of electricity by the former hydroelectric plant. In addition, the spillway would be modified as required in order to pass river flows and maintain the impoundment's water surface elevation at the current conditions.

Retirement Option 2, Partial Removal of the Dam Structures: This scenario would consider demolition and removal of certain elements of the hydroelectric site in order to drain the existing impoundment and create a natural river channel through the dam site. This would generally include removal of the generating units and powerhouse and possibly but not inclusively demolition and removal of substantial portions of concrete spillway structures. This option would address the removal and stabilization of any sediments that have accumulated at the upstream end of the dam and the stabilization of the newly exposed reservoir/riverbanks.

Retirement Option 3, Complete Removal of the Dam and Powerhouse: This scenario would consider complete removal of the electric generating components and powerhouse and complete removal of the dam. Similar to option 2, this option would address the removal and stabilization of any sediments that have accumulated at the upstream end of the dam and the stabilization of the newly exposed reservoir/riverbanks.

The scope of dismantlement for each retirement option, as interpreted from the definitions above, are identified on marked plant drawings included as Exhibit 4. The scope of dismantlement and the sequence of demolition for each retirement option are defined on these sketches.

Retirement options 2 and 3 include the same demolition work as retirement option 1, removal of the generating unit components from the powerhouse. The powerhouse is not removed in retirement option 1, but is removed in retirement option 3. For retirement option 2 the powerhouse may or may not be removed, depending on if removal of portions of the dam can restore river flow to natural flow without removing the powerhouse (refer to Exhibit 4).

For each of the retirement options the scope of sediment removal is based on the quantity that would be disturbed from the demolition work itself and not complete removal of all sediment potentially disturbed by the partial or complete removal of the dam. The subcontractor costs included in retirement options 2 and 3 are for lime stabilization of the sediment and removal of the sediment and other wastes (such as timber) to the waste disposal site. These costs do not apply to retirement option 1 since only generating unit components in the powerhouse are removed and this material has scrap value.

Retirement options 2 and 3 include the stabilization of newly exposed riverbanks, which include the dam area and areas upstream of the dam. The extent of stabilization for retirement option 3 may be slightly more than retirement option 2, since the entire dam is being removed in retirement option 3.

The following are excluded from the scope of the conceptual demolition cost estimates:

- Asbestos removal (separate cost estimate prepared).
- The conceptual demolition cost estimate includes the cost to remove the one (1) main power transformer located in the switchyard, but not the cost to remove the switchyard itself (and remaining components in the switchyard).
- Evaluation of the effect of the complete removal of the series of dams on the river watershed.
- Evaluation of the effect of the removal of any one dam, on either the upstream or downstream side dam and reservoir, after removal of the dam.
- Potential social or environmental impact of the draining of the reservoirs and the impact on property values or other community impact.
- The conceptual demolition cost estimate excludes any costs related to performing surveys to quantify the amount of sediment and chemical testing of the sediment. The quantity of sediment to be removed was estimated for retirement options 2 and 3 and the cost to remove the sediment is included in the conceptual demolition cost estimate. As stated above, the scope of sediment removal is based on the quantity that would be disturbed from the demolition work itself and not complete removal of the sediment potentially disturbed by the partial or complete removal of the dam.

The scope of the demolition cost estimate was reaffirmed during a review of the facility by two S&L employees in conjunction with a representative from Bradenburg Industrial Service Co. and AEP corporate and plant personnel. The facility review was held on Tuesday December 15, 2015.

## 4.0 COMMERCIAL BASIS

### 4.1 General Information

The Conceptual Demolition Cost Estimates prepared for the Mottville Hydroelectric Plant is a conceptual estimate of the cost to dismantle the powerhouse and dam in accordance with the scope defined for each of the three (3) retirement options. Costs were calculated for (1) demolition of existing plant structures and equipment and associated site restoration costs, (2) scrap value of steel, copper and stainless steel, as applicable, (3) associated indirect costs, and (4) contingency.

All units used in the cost estimate are U.S. Standard and all costs are in US Dollars (4$^{th}$ Quarter 2015 levels). A three (3) year demolition schedule is anticipated for retirement option 3 including asbestos removal (to be performed prior to start of demolition work). The schedule takes into consideration environmental permitting, asbestos removal which includes mapping out all asbestos contamination throughout the powerhouse and associated abatement, followed by total plant demolition and site restoration. The schedule for the other two (2) retirement options would be correspondingly less.

### 4.2 Quantities/Material Cost

Quantities of pieces of equipment and/or bulk material commodities used in the cost estimates were intended to be reasonable and representative of projects of this type. Material quantities were estimated from the hydroelectric plant drawings and data provided by AEP, and the information obtained from Plant personnel during the facility review.

### 4.3 Construction Labor Wages

Craft labor rates (Craft Hourly Rate) for the cost estimate were calculated as Union Labor rates for South Bend, Indiana, based on 2015, R. S. Means “Labor Rates for the Construction Industry”. The craft rates were incorporated into work crews appropriate for the activities by adding allowances for small tools, construction equipment, insurance, and site overheads to arrive at crew hourly rates detailed in the cost estimate. A 1.10 regional labor productivity multiplier was included based on Compass International Global Construction Yearbook, 2015 Edition, for union work in Indiana. National Maintenance

Agreement Rates (typically negotiated by AEP) do not apply as this work is assumed to be performed as a lump sum contract.

### 4.3.1 Labor Work Schedule and Incentives

The estimate assumed a 5x8 work week. No per diem or other labor incentives are included.

### 4.3.2 Construction Indirects

Allowances were included in the cost estimate as direct costs as noted for the following:

- Freight: Material and scrap freight included in the material and scrap costs.
- Additional Crane Allowance: None included. Cost of cranes and construction machinery are included in the labor wage rates.
- Mobilization and Demobilization: Included in labor wage rates.
- Scaffolding: Included in labor wage rates.
- Consumables: Included in material and labor costs.
- Per Diem Costs: Excluded from the estimate.
- Contractor's General and Administrative Costs and Profit: Included in the labor wage rates.

## 4.4 Scrap Value

The value of scrap was determined by a 3 month average (November and December 2015 and January 2016) using Zone 4 (USA Midwest) of the "Scrap Metals Market Watch" (www.americanrecycler.com).

Since the values obtained are delivered pieces, 25% of the values obtained were deducted to pay for separation, preparation and shipping to the mills. This resulted in realized prices of:

- Mixed Steel Value @ $118/Ton
- Copper Value @ $3,180/Ton
- Stainless Steel @ $675/Ton

Note: 1 Ton = 2,000 Lbs

All steel is considered to be mixed steel unless otherwise noted.

### 4.5 Indirect Costs

Allowances were included in the cost estimate as indirect costs as noted for the following:

- Engineering, Procurement and Project Services: None included.
- Construction Management Support: None included.
- Owners Cost: Included as 10.0% of the total direct cost. Owners Costs include owner project engineering, administration and construction management, permits and fees, legal expenses, taxes, removal of chemicals, etc.

### 4.6 Escalation

No allowance for escalation was included in the cost estimate. All costs are determined in 4$^{th}$ Quarter 2015 levels.

### 4.7 Contingency

Allowances were included in the cost estimate as contingency as noted for the following:

- Scrap Value: Included as 15.0% reduction in the salvage value resulting in a total net reduction in the salvage value. The contingency assumes a potential drop in salvage value thus increasing the project cost. Scrap costs are very volatile but by taking a 3-month average some of the effect of volatility is reduced. However there are other variables that affect scrap pricing such as the quantity and processing fees. The contingency applied is based on the estimators confidence in scrap pricing used in the demolition cost estimate.
- Material: Included as 20.0% of the total material cost.
- Labor: Included as 20.0% of the total labor cost.
- Indirect: Included as 20.0% of the total indirect cost.
- Subcontractor: Included as 20.0% of the total subcontractor cost.

### 4.8 Assumptions

The following assumptions apply to the cost estimates.

- The cost estimate for each retirement option is based on the scope and the demolition sequences defined on the sketches provided in Exhibit 4.
- All chemicals will be removed by the Owner prior to demolition, from the facilities to be demolished.

- All electrical equipment and wiring is de-energized prior to start of dismantlement, except for that required for remote operation of two (2) of the tainter gates after demolition is completed for retirement option 1.
- No extraordinary environmental costs for demolition have been included.
- Handling, on-site and off-site disposal of hazardous materials would be performed in compliance with methods approved by Owner.
- The window glazing in the powerhouse may be asbestos contaminated and an allowance for removal and disposal is included in the asbestos removal cost estimate. There is no building or pipe insulation in the facility and consequently no insulation related asbestos contamination.
- Switchyards within the plant boundaries are not part of the scope, neither are access roads to these facilities. Fences and gates needed to protect the switchyard will be left in place.
- All demolished materials are considered debris, except for organic combustibles and non-embedded metals which have scrap value.
- The basis for salvage estimating is for scrap value only. No resale of equipment or material is included.
- Sediment removed due to demolition work is treated with lime and hauled offsite to an approved waste disposal facility.

## 5.0 REFERENCES

**5.1** Mottville Plant Drawings: One-Line Diagrams, No. E-1000, Revision 16 and No. 14-12001-2, 12/17/91.

**5.2** American Electric Power, Supporting Technical Information Document, Mottville Hydroelectric Project, September, 2007.

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# EXHIBIT 1
# Mottville Hydroelectric Plant
# Conceptual Demolition Cost Estimate Summary

Mottville Hydroelectric Plant
Indiana Michigan Power Company
American Electric Power Service Corporation
Estimate Number: 33709B



| | Retirement Option 1 | Retirement Option 2 | Retirement Option 3 |
|---|---|---|---|
| Demolition Cost | $ 65,833 | $ 4,337,930 | $ 4,889,193 |
| Scrap Value | $ (28,733) | $ (34,814) | $ (85,278) |
| Direct Cost Subtotal | $ 37,100 | $ 4,303,116 | $ 4,803,914 |
| Indirect Cost | $ 4,000 | $ 438,000 | $ 489,000 |
| Contingency Cost | $ 18,200 | $ 961,000 | $ 1,089,000 |
| Escalation Cost | $ - | $ - | $ - |
| Total Demolition Cost | $ 59,300 | $ 5,702,116 | $ 6,381,915 |

# EXHIBIT 2
# Mottville Hydroelectric Plant
# Conceptual Demolition Cost Estimate No. 33709B

# AEP MOTTVILLE
# HYDROELECTRIC PLANT DISMANTLEMENT STUDY
# CONCEPTUAL COST ESTIMATE

| | |
|---|---|
| **Client** | AEP |
| **Estimator** | RCK |
| **Labor rate table** | 15INSOU |
| **Project No.** | 13465-000 |
| **Station Name** | ELKHART |
| **Unit** | ALL |
| **Estimate Date** | 02/12/2016 |
| **Reviewed By** | ADC |
| **Approved By** | MNO |
| **Estimate No.** | 33709B |
| **Estimate Class** | Conceptual |
| **Cost index** | INSOU |

**AEP MOTTVILLE**
**HYDROELECTRIC PLANT DISMANTLEMENT STUDY**
**CONCEPTUAL COST ESTIMATE**



| Area | Description | Subcontract Cost | Scrap Value | Material Cost | Man Hours | Labor Cost | Total Cost |
|---|---|---|---|---|---|---|---|
| ACCOUNT A | DEMOLITION ACCOUNT A | | (28,733) | 11,020 | 587 | 54,813 | 37,100 |
| ACCOUNT B | DEMOLITION ACCOUNT B | 506,220 | (6,081) | 2,248,154 | 20,696 | 1,517,723 | 4,266,016 |
| ACCOUNT C | DEMOLITION ACCOUNT C | 135,460 | (50,464) | | 4,820 | 415,803 | 500,798 |
| | TOTAL DIRECT | 641,680 | (85,278) | 2,259,174 | 26,103 | 1,988,339 | 4,803,915 |

## Estimate Totals

| Description | Amount | Totals | Hours |
|---|---|---|---|
| **Direct Costs:** | | | |
| Labor | 1,988,339 | | 26,103 |
| Material | 2,259,174 | | |
| Subcontract | 641,680 | | |
| Scrap Value | (85,278) | | |
| | **4,803,915** | **4,803,915** | |
| **Other Direct & Construction Indirect Costs:** | | | |
| 91-1 Scaffolding | | | |
| 91-2 Cost Due To OT 5-10's | | | |
| 91-3 Cost Due To OT 6-10's | | | |
| 91-4 Per Diem | | | |
| 91-5 Consumables | | | |
| 91-8 Freight on Material | | | |
| 91-9 Freight on Process Equip | | | |
| 91-10 Sales Tax | | | |
| 91-11 Contractors G&A | | | |
| 91-12 Contractors Profit | | | |
| | | **4,803,915** | |
| **Indirect Costs:** | | | |
| 93-1 Engineering Services | | | |
| 93-2 CM Support | | | |
| 93-3 Start-Up/Commissioning | | | |
| 93-4 Start-Up/Spare Parts | | | |
| 93-5 Excess Liability Insur. | | | |
| 93-6 Sales Tax On Indirects | | | |
| 93-7 Owners Cost | 489,000 | | |
| 93-8 EPC Fee | | | |
| | **489,000** | **5,292,915** | |
| **Contingency:** | | | |
| 94-1 Contingency on Material | 452,000 | | |
| 94-2 Contingency on Labor | 398,000 | | |
| 94-3 Contingency on Sub. | 128,000 | | |
| 94-6 Contingency on Scrap | 13,000 | | |
| 94-5 Contingency on Indirect | 98,000 | | |
| | **1,089,000** | **6,381,915** | |
| **Escalation:** | | | |
| 96-1 Escalation on Material | | | |
| 96-2 Escalation on Labor | | | |
| 96-3 Escalation on Subcontract | | | |
| 96-4 Escalation on Scrap | | | |
| 96-5 Escalation on Indirects | | | |
| | | **6,381,915** | |
| | | **6,381,915** | |
| ***Total*** | | ***6,381,915*** | |

| Area | Group | Phase | Description | Notes | Quantity | Man Hours | Crew Rate | Labor Cost | Material Cost | Subcontract Cost | Scrap Value | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ACCOUNT A | | | DEMOLITION ACCOUNT A | | | | | | | | | |
| | 10.00.00 | | WHOLE PLANT DEMOLITION | | | | | | | | | |
| | | 10.31.00 | MECHANICAL EQUIPMENT | | | | | | | | | |
| | | | DEMO .4 MW GENERATOR | 4 GENERATORS AT 7500# EA | 15.00 TN | 149 | 83.69 /MH | 12,429 | | - | | 12,429 |
| | | | DEMO TURBINE AND GEARS | 4 TUBINES & GEARS AT 11000# EA | 22.00 TN | 218 | 83.69 /MH | 18,230 | | - | | 18,230 |
| | | | TURBINE ROOM 15 TON BRIDGE CRANE | 15 TON BRIDGE CRANE | 11.30 TN | 112 | 122.82 /MH | 13,741 | | - | | 13,741 |
| | | | BAR RACKS | 4 AT 5 TONS EACH | 20.00 TN | 45 | 122.82 /MH | 5,472 | | - | | 5,472 |
| | | | MECHANICAL EQUIPMENT | | | 523 | | 49,872 | | | | 49,872 |
| | | | WHOLE PLANT DEMOLITION | | | 523 | | 49,872 | | | | 49,872 |
| | 18.00.00 | | SCRAP VALUE | | | | | | | | | |
| | | 18.10.00 | MIXED STEEL | | | | | | | | | |
| | | | MIXED STEEL | .4 MW GENERATOR, 4 @4,125# EA | -8.25 TN | | 77.78 /MH | | - | - | (974) | (974) |
| | | | MIXED STEEL | 4 TUBINES & GEARS AT 11000# EA | -22.00 TN | | 77.78 /MH | | - | - | (2,598) | (2,598) |
| | | | MIXED STEEL | TURBINE ROOM 15 TON BRIDGE CRANE | -11.30 TN | | 77.78 /MH | | - | - | (1,334) | (1,334) |
| | | | MIXED STEEL | BAR RACKS | -20.00 TN | | 77.78 /MH | | - | - | (2,362) | (2,362) |
| | | | MIXED STEEL | | | | | | | | (7,268) | (7,268) |
| | | 18.30.00 | COPPER | | | | | | | | | |
| | | | COPPER | 4 GENERATORS AT 3375# EA | -6.75 TN | | 77.78 /MH | | - | - | (21,465) | (21,465) |
| | | | COPPER | | | | | | | | (21,465) | (21,465) |
| | | | SCRAP VALUE | | | | | | | | (28,733) | (28,733) |
| | 22.00.00 | | CONCRETE | | | | | | | | | |
| | | 22.13.00 | Concrete | | | | | | | | | |
| | | | FLOWABLE FILL, 1500 PSI | FILL PENSTOCKS TO PREVENT BYPASS FLOW | 116.00 CY | 64 | 77.44 /MH | 4,941 | 11,020 | - | - | 15,961 |
| | | | Concrete | | | 64 | | 4,941 | 11,020 | | | 15,961 |
| | | | CONCRETE | | | 64 | | 4,941 | 11,020 | | | 15,961 |
| | | | ACCOUNT A DEMOLITION ACCOUNT A | | | 587 | | 54,813 | 11,020 | | (28,733) | 37,100 |
| ACCOUNT B | | | DEMOLITION ACCOUNT B | | | | | | | | | |
| | 10.00.00 | | WHOLE PLANT DEMOLITION | | | | | | | | | |
| | | 10.22.00 | CONCRETE | | | | | | | | | |
| | | | EQUIPMENT/ BUILDING FOUNDATION | FISH LADDER | 113.00 CY | 140 | 85.21 /MH | 11,917 | | - | - | 11,917 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | TAINTER GATE - OGEE SECTION | 245.00 CY | 303 | 85.21 /MH | 25,837 | | - | - | 25,837 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | TAINTER GATE - BUTTRESSES | 301.00 CY | 373 | 85.21 /MH | 31,743 | | - | - | 31,743 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | TAINTER GATE - WEIR AND STILLING POND | 255.00 CY | 316 | 85.21 /MH | 26,892 | | - | - | 26,892 |
| | | | CONCRETE | | | 1,131 | | 96,389 | | | | 96,389 |
| | | 10.23.00 | STEEL | | | | | | | | | |
| | | | STRUCTURAL AND GIRT STEEL | TAINTER GATES STRUCTURE AND WALKWAY | 50.00 TN | 56 | 77.78 /MH | 4,347 | | - | - | 4,347 |
| | | | STEEL | | | 56 | | 4,347 | | | | 4,347 |
| | | 10.31.00 | MECHANICAL EQUIPMENT | | | | | | | | | |
| | | | 60 KW PROPANE ELECTRIC GENERATOR | 60 KW PROPANE ELECTRIC GENERATOR | 1.50 TN | 3 | 122.82 /MH | 410 | | - | | 410 |
| | | | MECHANICAL EQUIPMENT | | | 3 | | 410 | | | | 410 |
| | | | WHOLE PLANT DEMOLITION | | | 1,190 | | 101,146 | | | | 101,146 |
| | 18.00.00 | | SCRAP VALUE | | | | | | | | | |
| | | 18.10.00 | MIXED STEEL | | | | | | | | | |
| | | | MIXED STEEL | 60 KW PROPANE ELECTRIC GENERATOR | -1.50 TN | | 77.78 /MH | | - | - | (177) | (177) |
| | | | MIXED STEEL | TAINTER GATES & WALKWAY | -50.00 TN | | 77.78 /MH | | - | - | (5,904) | (5,904) |
| | | | MIXED STEEL | | | | | | | | (6,081) | (6,081) |
| | | | SCRAP VALUE | | | | | | | | (6,081) | (6,081) |
| | 21.00.00 | | CIVIL WORK | | | | | | | | | |
| | | 21.17.00 | EXCAVATION | | | | | | | | | |
| | | | FOUNDATION EXCAVATION, CLAY USING 1 CY BACKHOE | RIVERBED EXCAVATION FOR RIPRAP | 90.00 CY | 17 | 84.18 /MH | 1,417 | | - | - | 1,417 |
| | | | EXCAVATION | | | 17 | | 1,417 | | | | 1,417 |
| | | 21.41.00 | Erosion and Sedimentation Control | | | | | | | | | |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | NEW STONE REQD IF CAUSEWAY STONE IS REUSED (46850-3408) | 43,444.00 CY | 14,190 | 71.48 /MH | 1,014,287 | 1,776,860 | - | - | 2,791,146 |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | FOR CAUSEWAYS | 3,408.00 CY | 1,113 | 71.48 /MH | 79,567 | 139,387 | - | - | 218,954 |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | RELOCATE CAUSE WAY STONE FOR RIVER | 3,408.00 CY | 1,113 | 71.48 /MH | 79,567 | | - | - | 79,567 |

| Area | Group | Phase | Description | Notes | Quantity | Man Hours | Crew Rate | Labor Cost | Material Cost | Subcontract Cost | Scrap Value | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 21.41.00 | Erosion and Sedimentation Control | | | | | | | | | |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | BEND PR0TECTION | 3,408.00 CY | 1,113 | 71.48 /MH | 79,567 | | - | - | 79,567 |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | RIP RAP PROTECTION AT FLOOR SLABS TO REMAIN IN PLACE | 90.00 CY | 29 | 71.48 /MH | 2,101 | 3,681 | - | - | 5,782 |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | RIP RAP PROTECTION AT ABUTMENTS TO REMAIN IN PLACE (240-90) | 150.00 CY | 49 | 71.48 /MH | 3,502 | 6,135 | - | - | 9,637 |
| | | | Erosion and Sedimentation Control | | | 16,494 | | 1,179,023 | 1,926,063 | | | 3,105,086 |
| | | 21.47.00 | LANDSCAPING | | | | | | | | | |
| | | | HYDRO OR AIR SEED & MULCH & FERTILIZER | | 211.00 AC | 2,994 | 78.86 /MH | 236,138 | 322,092 | - | - | 558,229 |
| | | | LANDSCAPING | | | 2,994 | | 236,138 | 322,092 | | | 558,229 |
| | | 21.65.00 | Soil Remediation | | | | | | | | | |
| | | | REMOVAL OF LOCALIZED SILT AT DAM | LIME ADDITIVE FOR DRYING | 2,301.00 CY | | 187.65 /MH | | | 92,040 | - | 92,040 |
| | | | REMOVAL OF LOCALIZED SILT AT DAM | LOAD, MIX AND HAUL LIME AND SEDIMENT MIX (4602+2301) | 6,903.00 CY | | 187.65 /MH | | | 414,180 | - | 414,180 |
| | | | Soil Remediation | | | | | | | 506,220 | | 506,220 |
| | | | CIVIL WORK | | | 19,506 | | 1,416,577 | 2,248,154 | 506,220 | | 4,170,952 |
| | | | **ACCOUNT B DEMOLITION ACCOUNT B** | | | **20,696** | | **1,517,723** | **2,248,154** | **506,220** | **(6,081)** | **4,266,016** |
| **ACCOUNT C** | | | **DEMOLITION ACCOUNT C** | | | | | | | | | |
| | 10.00.00 | | WHOLE PLANT DEMOLITION | | | | | | | | | |
| | | 10.22.00 | CONCRETE | | | | | | | | | |
| | | | EQUIPMENT/ BUILDING FOUNDATION | DOWNSTREAM APRON | 288.00 CY | 356 | 85.21 /MH | 30,372 | | - | - | 30,372 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | GENERATOR HOUSE - | 1,800.00 CY | 2,228 | 85.21 /MH | 189,824 | | - | - | 189,824 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | GENERATOR HOUSE - TAILRACE APRON | 200.00 CY | 248 | 85.21 /MH | 21,092 | | - | - | 21,092 |
| | | | CONCRETE | | | 2,832 | | 241,288 | | | | 241,288 |
| | | 10.23.00 | STEEL | | | | | | | | | |
| | | | STRUCTURAL AND GIRT STEEL | GENERATOR HOUSE | 65.00 TN | 73 | 77.78 /MH | 5,651 | | - | - | 5,651 |
| | | | STEEL | | | 73 | | 5,651 | | | | 5,651 |
| | | 10.24.00 | ARCHITECTURAL | | | | | | | | | |
| | | | GENERATOR HOUSE | 132.5'x28'x70' TALL | 259,700.00 CF | 1,114 | 89.78 /MH | 100,035 | | - | - | 100,035 |
| | | | ARCHITECTURAL | | | 1,114 | | 100,035 | | | | 100,035 |
| | | 10.31.00 | MECHANICAL EQUIPMENT | | | | | | | | | |
| | | | DEMO PENSTOCKS | 4 PENSTOCKS AT 9,300# EA | 70.80 TN | 701 | 83.69 /MH | 58,666 | | - | | 58,666 |
| | | | STOP LOGS | 4 AT 5 TONS EACH | 20.00 TN | 45 | 122.82 /MH | 5,472 | | - | | 5,472 |
| | | | MECHANICAL EQUIPMENT | | | 746 | | 64,138 | | | | 64,138 |
| | | 10.41.00 | ELECTRICAL EQUIPMENT | | | | | | | | | |
| | | | GENERATOR BUS TRANSFORMERS | 2.4 to 34.5 KV, 2500 KVA (STEEL) | 6.65 TN | 20 | 82.70 /MH | 1,617 | | - | - | 1,617 |
| | | | GENERATOR BUS TRANSFORMERS | 2.4 to 34.5 KV, 2500 KVA (CU) | 1.44 TN | 4 | 82.70 /MH | 350 | | - | - | 350 |
| | | | MISCELLANEOUS ELECTRICAL EQUIPMENT | | 5.00 TN | 15 | 82.70 /MH | 1,215 | | - | - | 1,215 |
| | | | ELECTRICAL EQUIPMENT | | | 38 | | 3,182 | | | | 3,182 |
| | | 10.86.00 | WASTE | | | | | | | | | |
| | | | WASTE - USER DEFINED | MISC | 1.00 LS | 0 | 122.82 /MH | 14 | | - | 10,000 | 10,014 |
| | | | WASTE | | | 0 | | 14 | | | 10,000 | 10,014 |
| | | | WHOLE PLANT DEMOLITION | | | 4,803 | | 414,307 | | | 10,000 | 424,307 |
| | 18.00.00 | | SCRAP VALUE | | | | | | | | | |
| | | 18.10.00 | MIXED STEEL | | | | | | | | | |
| | | | MIXED STEEL | 4 PENSTOCKS AT 9,300# EA | -4.60 TN | | 77.78 /MH | | - | - | (543) | (543) |
| | | | MIXED STEEL | STOP LOGS | -20.00 TN | | 77.78 /MH | | - | - | (2,362) | (2,362) |
| | | | MIXED STEEL | GENERATOR HOUSE | -65.00 TN | | 77.78 /MH | | - | - | (7,675) | (7,675) |
| | | | MIXED STEEL | GENERATOR BUS TRANSFORMERS | -6.65 TN | | 77.78 /MH | | - | - | (785) | (785) |
| | | | MIXED STEEL | | | | | | | | (11,365) | (11,365) |
| | | 18.30.00 | COPPER | | | | | | | | | |
| | | | COPPER | CABLE | -10.00 TN | | 77.78 /MH | | - | - | (31,800) | (31,800) |
| | | | COPPER | MISC. TRANSFORMERS & MOTORS UNIT 1 | -4.00 TN | | 77.78 /MH | | - | - | (12,720) | (12,720) |
| | | | COPPER | GENERATOR BUS TRANSFORMERS | -1.44 TN | | 77.78 /MH | | - | - | (4,579) | (4,579) |
| | | | COPPER | | | | | | | | (49,099) | (49,099) |
| | | | SCRAP VALUE | | | | | | | | (60,464) | (60,464) |

| Area | Group | Phase | Description | Notes | Quantity | Man Hours | Crew Rate | Labor Cost | Material Cost | Subcontract Cost | Scrap Value | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 21.00.00 | | CIVIL WORK | | | | | | | | | |
| | | 21.17.00 | EXCAVATION | | | | | | | | | |
| | | | FOUNDATION EXCAVATION, CLAY USING 1 CY BACKHOE | RIVERBED EXCAVATION FOR DAM ABUTMENTS | 100.00 CY | 19 | 84.18 /MH | 1,574 | | - | - | 1,574 |
| | | | FOUNDATION EXCAVATION, CLAY USING 1 CY BACKHOE | RIVERBED EXCAVATION FOR RIPRAP CREDIT (85-90) | -5.00 CY | -1 | 84.18 /MH | (79) | | - | - | (79) |
| | | | EXCAVATION | | | 18 | | 1,496 | | | | 1,496 |
| | | 21.65.00 | Soil Remediation | | | | | | | | | |
| | | | REMOVAL OF LOCALIZED SILT AT DAM | LIME ADDITIVE FOR DRYING DELTA (2917-2301) | 616.00 CY | | 187.65 /MH | | | 24,640 | - | 24,640 |
| | | | REMOVAL OF LOCALIZED SILT AT DAM | LOAD, MIX AND HAUL LIME AND SEDIMENT MIX DELTA (8750-6903) | 1,847.00 CY | | 187.65 /MH | | | 110,820 | - | 110,820 |
| | | | Soil Remediation | | | | | | | 135,460 | | 135,460 |
| | | | CIVIL WORK | | | 18 | | 1,496 | | 135,460 | | 136,956 |
| | | | **ACCOUNT C DEMOLITION ACCOUNT C** | | | **4,820** | | **415,803** | | **135,460** | **(50,464)** | **500,798** |

# EXHIBIT 3
# Mottville Hydroelectric Plant
# Asbestos Removal Conceptual Cost Estimate No. 33741B

# AEP MOTTVILLE
# HYDROELECTRIC PLANT DISMANTLEMENT STUDY - ASBESTOS REMOVAL
# CONCEPTUAL COST ESTIMATE

| | |
|---|---|
| **Client** | AEP |
| **Estimator** | RCK |
| **Labor rate table** | 15INSOU |
| **Project No.** | 13465-000 |
| **Station Name** | ELKHART |
| **Unit** | ALL |
| **Estimate Date** | 02/12/2016 |
| **Reviewed By** | ADC |
| **Approved By** | MNO |
| **Estimate No.** | 33741B |
| **Estimate Class** | Conceptual |
| **Cost index** | INSOU |

**AEP MOTTVILLE**
**HYDROELECTRIC PLANT DISMANTLEMENT STUDY - ASBESTOS REMOVAL**
**CONCEPTUAL COST ESTIMATE**



| Area | Description | Subcontract Cost | Scrap Value | Material Cost | Man Hours | Labor Cost | Total Cost |
|---|---|---|---|---|---|---|---|
| ASBESTOS | ASBESTOS REMOVAL | 3,800 | | | | | 3,800 |
| | TOTAL DIRECT | 3,800 | | | | | 3,800 |

## Estimate Totals

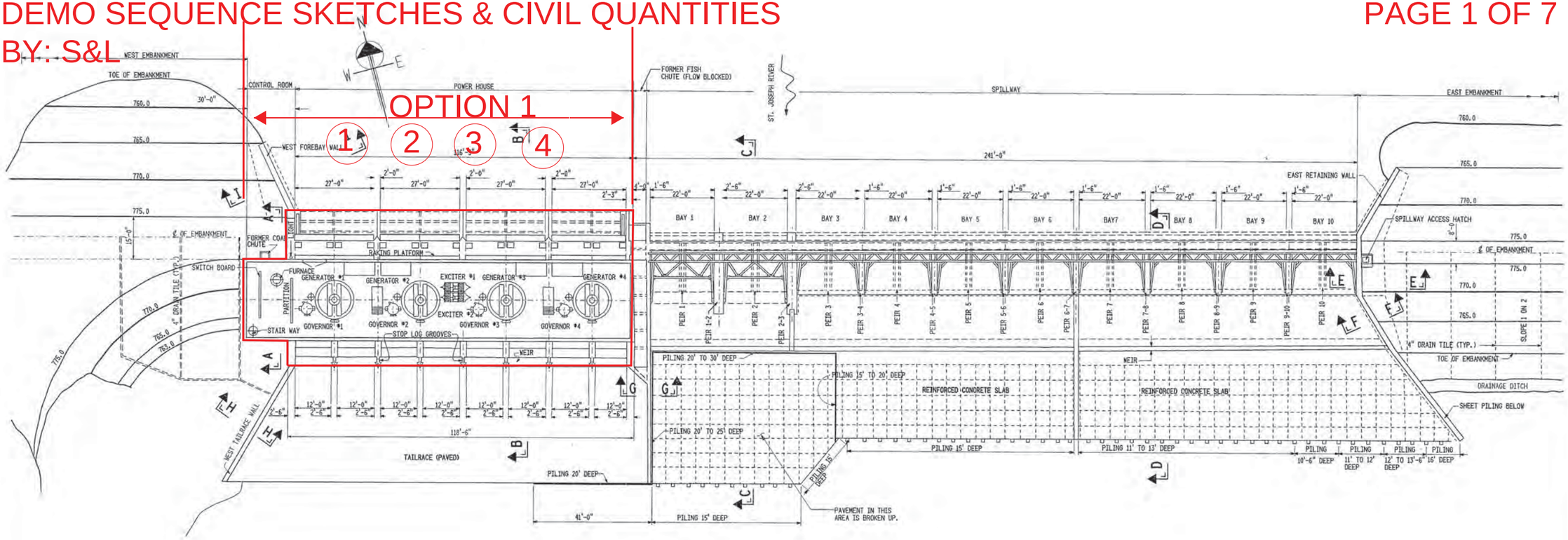
| Description | Amount | Totals | Hours |
|---|---|---|---|
| **Direct Costs:** | | | |
| Labor | | | |
| Material | | | |
| Subcontract | 3,800 | | |
| Scrap Value | | | |
| | **3,800** | **3,800** | |
| **Other Direct & Construction** | | | |
| **Indirect Costs:** | | | |
| 91-1 Scaffolding | | | |
| 91-2 Cost Due To OT 5-10's | | | |
| 91-3 Cost Due To OT 6-10's | | | |
| 91-4 Per Diem | | | |
| 91-5 Consumables | | | |
| 91-8 Freight on Material | | | |
| 91-9 Freight on Process Equip | | | |
| 91-10 Sales Tax | | | |
| 91-11 Contractors G&A | | | |
| 91-12 Contractors Profit | | | |
| | | **3,800** | |
| **Indirect Costs:** | | | |
| 93-1 Engineering Services | | | |
| 93-2 CM Support | | | |
| 93-3 Start-Up/Commissioning | | | |
| 93-4 Start-Up/Spare Parts | | | |
| 93-5 Excess Liability Insur. | | | |
| 93-6 Sales Tax On Indirects | | | |
| 93-7 Owners Cost | 400 | | |
| 93-8 EPC Fee | | | |
| | **400** | **4,200** | |
| **Contingency:** | | | |
| 94-1 Contingency on Material | | | |
| 94-2 Contingency on Labor | | | |
| 94-3 Contingency on Sub. | 800 | | |
| 94-6 Contingency on Scrap | | | |
| 94-5 Contingency on Indirect | 100 | | |
| | **900** | **5,100** | |
| **Escalation:** | | | |
| 96-1 Escalation on Material | | | |
| 96-2 Escalation on Labor | | | |
| 96-3 Escalation on Subcontract | | | |
| 96-4 Escalation on Scrap | | | |
| 96-5 Escalation on Indirects | | | |
| | | **5,100** | |
| | | **5,100** | |
| ***Total*** | | ***5,100*** | |

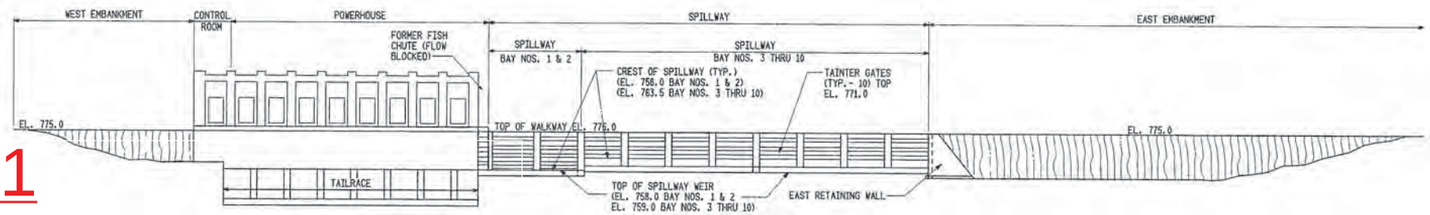
| Area | Group | Phase | Description | Notes | Quantity | Man Hours | Crew Rate | Labor Cost | Material Cost | Subcontract Cost | Scrap Value | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ASBESTOS | | | ASBESTOS REMOVAL | | | | | | | | | |
| | 10.00.00 | | WHOLE PLANT DEMOLITION | | | | | | | | | |
| | | 10.37.00 | ASBESTOS REMOVAL | | | | | | | | | |
| | | | ASBESTOS REMOVAL - MISC MATERIALS | WINDOW CAULKING MISC MATERIALS | 2.00 CY | | 121.33 /MH | | | 3,800 | - | 3,800 |
| | | | ASBESTOS REMOVAL | | | | | | | 3,800 | | 3,800 |
| | | | WHOLE PLANT DEMOLITION | | | | | | | 3,800 | | 3,800 |
| | | | ASBESTOS ASBESTOS REMOVAL | | | | | | | 3,800 | | 3,800 |

# EXHIBIT 4
# Mottville Hydroelectric Plant
# Retirement Option 1-3 Demolition Scope and Sequence

# MOTTVILLE HYDRO RETIREMENT
# DEMO SEQUENCE SKETCHES & CIVIL QUANTITIES
BY: S&L

JANUARY 25, 2016
PAGE 1 OF 7




## OPTION 1

1. INSTALL STOPLOGS
2. REMOVE EQUIPMENT
3. GROUT DRAFT TUBES
4. REMOVE STOPLOGS

EXHIBIT F - 1

INDIANA MICHIGAN POWER COMPANY
MOTTVILLE HYDROELECTRIC PROJECT
MOTTVILLE MICHIGAN
GENERAL DESIGN DRAWING
PLAN & ELEVATION

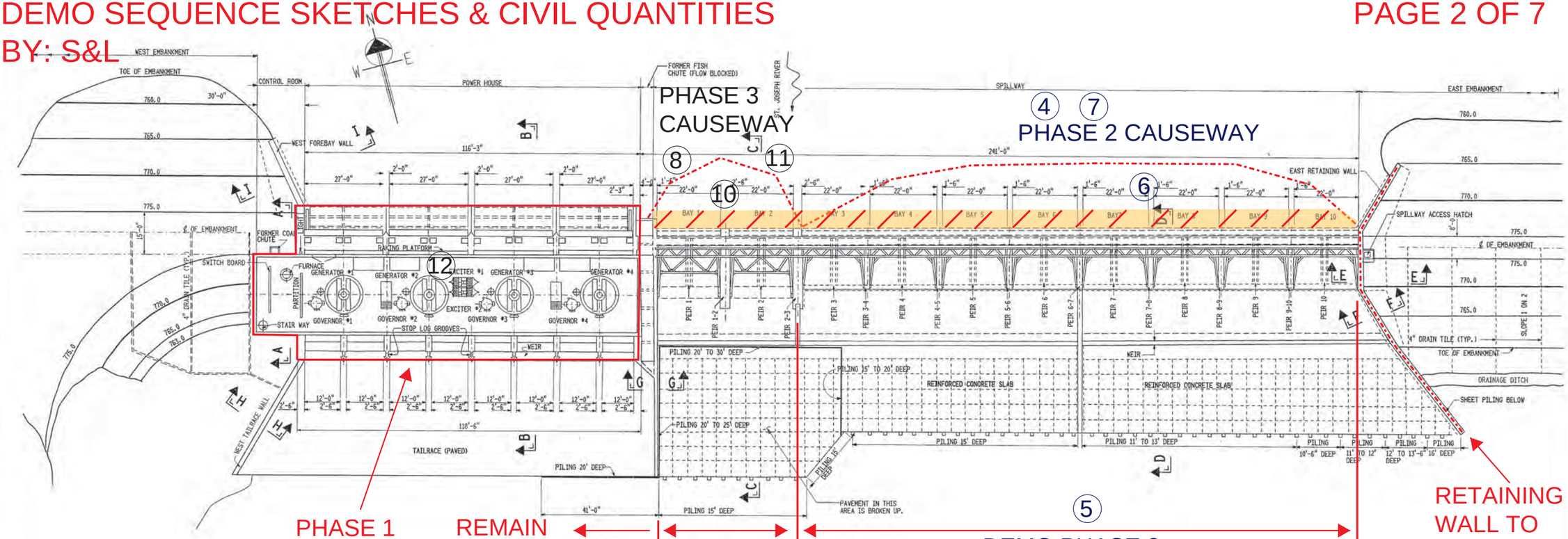
THIS DRAWING, EXHIBIT F-1, IS PART OF THE APPLICATION FOR LICENSE MADE BY INDIANA MICHIGAN POWER COMPANY

BY: _____

DATE: _____

# MOTTVILLE HYDRO RETIREMENT
# DEMO SEQUENCE SKETCHES & CIVIL QUANTITIES
BY: S&L

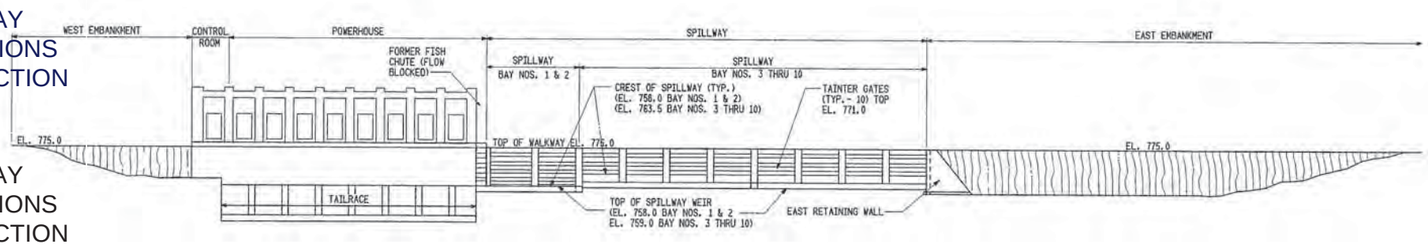
JANUARY 25, 2016


PHASE 1
① INSTALL STOPLOGS
② REMOVE EQUIPMENT
③ REMOVE STOPLOGS

PHASE 2
④ CONSTRUCT CAUSEWAY
⑤ DEMO SPILLWAY SECTIONS
⑥ PLACE RIPRAP PROTECTION
⑦ REMOVE CAUSEWAY

PHASE 3
⑧ CONSTRUCT CAUSEWAY
⑨ DEMO SPILLWAY SECTIONS
⑩ PLACE RIPRAP PROTECTION
⑪ REMOVE CAUSEWAY
⑫ GROUT DRAFT TUBES




# OPTION 2

ELEVATION LOOKING UPSTREAM
30 20 10 0 30 FEET

EXHIBIT F - 1

INDIANA MICHIGAN POWER COMPANY
MOTTVILLE HYDROELECTRIC PROJECT
MOTTVILLE MICHIGAN
GENERAL DESIGN DRAWING
PLAN & ELEVATION

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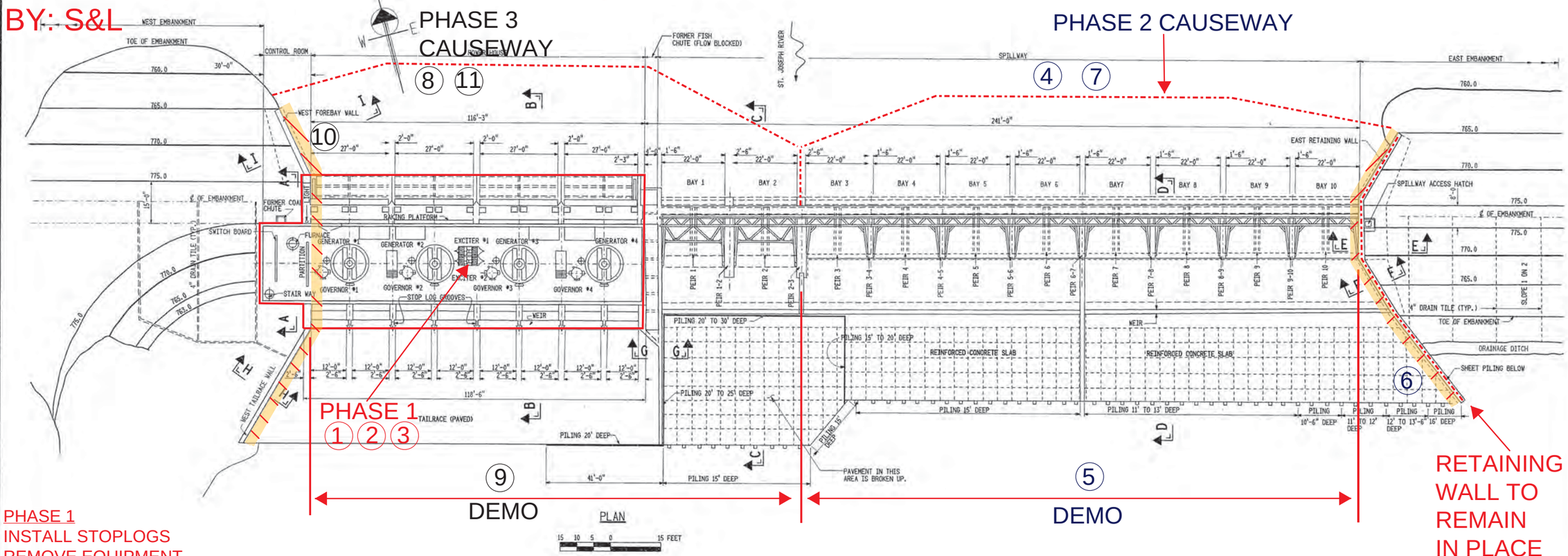
BY: _____

DATE: _____

# MOTTVILLE HYDRO RETIREMENT
# DEMO SEQUENCE SKETCHES & CIVIL QUANTITIES
# BY: S&L

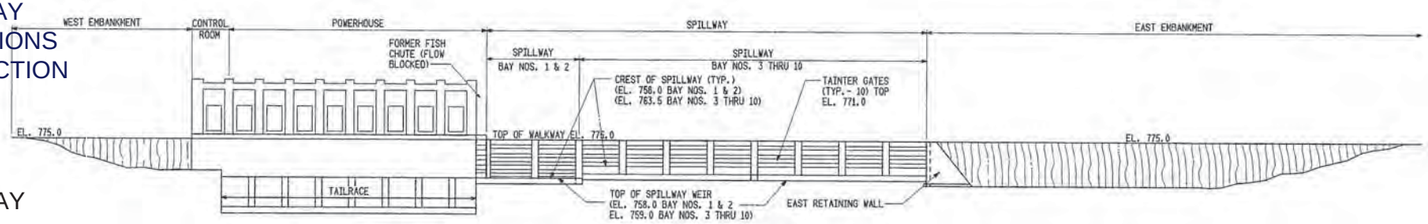
JANUARY 25, 2016
PAGE 3 OF 7




PHASE 1
① INSTALL STOPLOGS
② REMOVE EQUIPMENT
③ REMOVE STOPLOGS

PHASE 2
④ CONSTRUCT CAUSEWAY
⑤ DEMO SPILLWAY SECTIONS
⑥ PLACE RIPRAP PROTECTION AT RETAINING WALL
⑦ REMOVE SPILLWAY

PHASE 3
⑧ CONSTRUCT CAUSEWAY
⑨ DEMO GENERATION BUILDING AND SPILLWAY SECTIONS
⑩ PLACE RIPRAP PROTECTION AT RETAINING WALL
⑪ REMOVE CAUSEWAY




ELEVATION LOOKING UPSTREAM
30 20 10 0 30 FEET

# OPTION 3

EXHIBIT F - 1

INDIANA MICHIGAN POWER COMPANY
MOTTVILLE HYDROELECTRIC PROJECT
MOTTVILLE MICHIGAN
GENERAL DESIGN DRAWING
PLAN & ELEVATION

THIS DRAWING, EXHIBIT F-1, IS PART OF THE APPLICATION FOR LICENSE MADE BY INDIANA MICHIGAN POWER COMPANY

BY: _____

DATE: _____

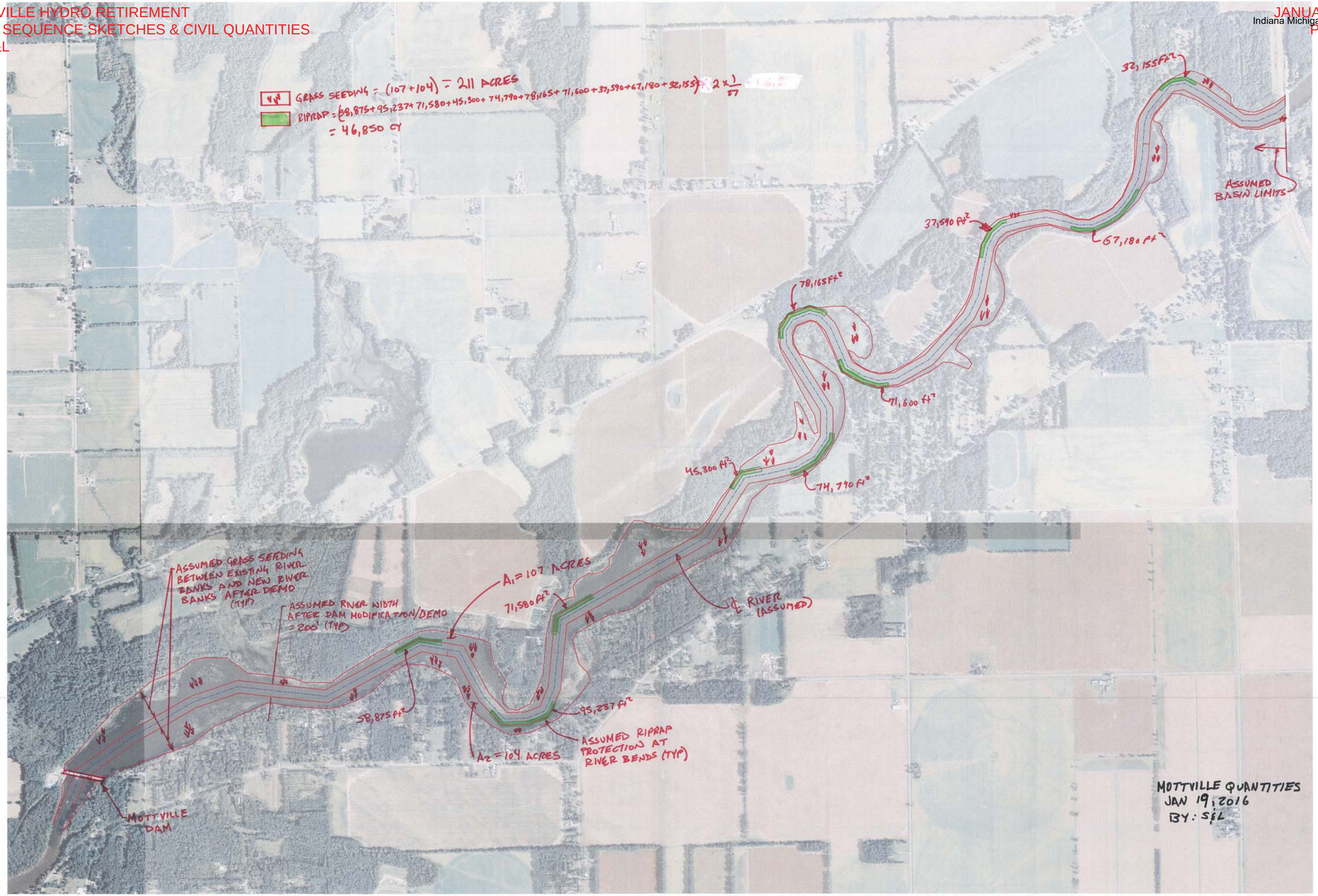
Indiana Michigan Power Company
Attachment JAC-3
Witness; Cash
Page 168 of 205

| MOTTVILLE | | | |
|---|---|---|---|
| OPTION 2 | | | |
| ITEM | QUANTITY | UNIT | REMARKS |
| GRASS SEEDING | 211 | ACRE | |
| RIPRAP PROTECTION | 46,850 | CY | 2 ft riprap protection @ D(50)=12" |
| RIPRAP PROTECTION AT FLOOR SLAB TO REMAIN IN PLACE | 90 | CY | |
| RIVERBED EXCAVATION FOR RIPRAP | 90 | CY | TO BE REPLACED BY RIPRAP |

| OPTION 3 | | | |
|---|---|---|---|
| ITEM | QUANTITY | UNIT | REMARKS |
| GRASS SEEDING | 211 | ACRE | |
| RIPRAP PROTECTION AT RIVER BENDS | 46,850 | CY | 2 ft riprap protection @ D(50)=12" |
| RIPRAP PROTECTION AT DAM ABUTMENTS | 100 | CY | 2 ft riprap protection @ D(50)=12" |
| RIVERBED EXCAVATION FOR RIPRAP | 85 | CY | TO BE REPLACED BY RIPRAP |

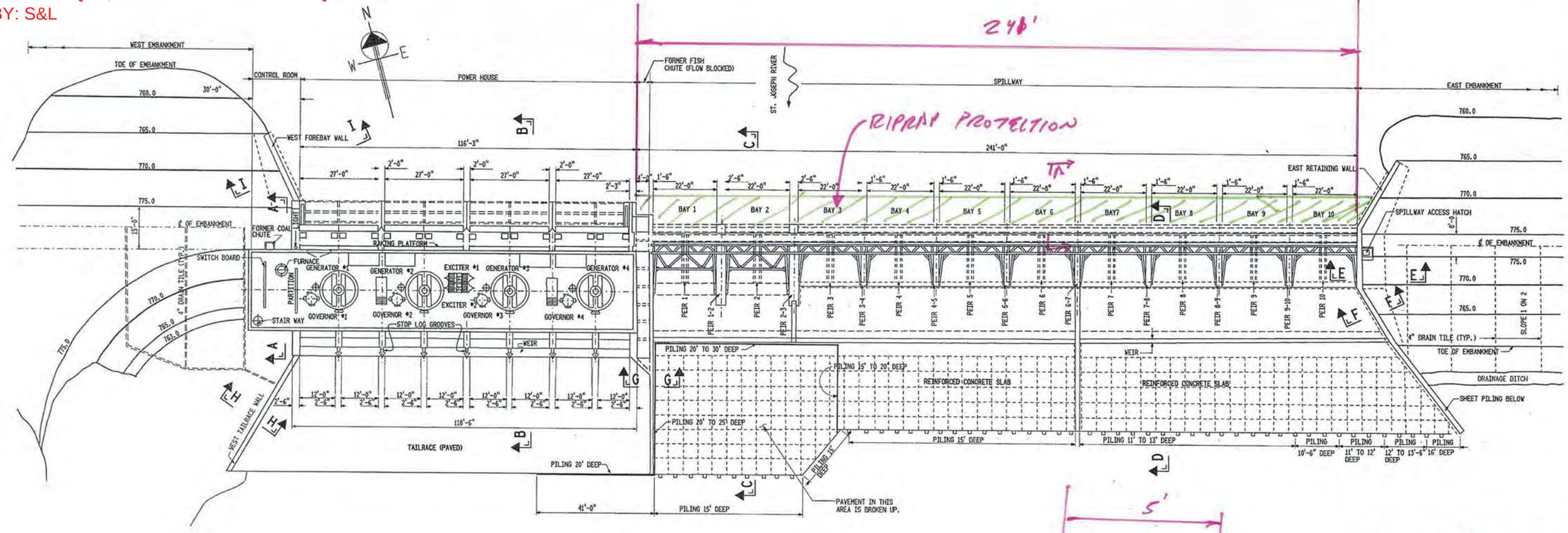
Note:

Localized miscellaneous silt removal and earthwork as part of dam demolition by Brandenburg


GRASS SEEDING = (107+104) = 211 ACRES
RIPRAP = {68,875+95,237+71,580+45,300+74,790+78,165+71,600+37,590+67,180+32,155} x 2 x 1/27
= 46,850 CY
32,155 Ft²
ASSUMED BASIN LIMITS
37,590 Ft²
67,180 Ft²
78,165 Ft²
71,600 Ft²
45,300 Ft²
74,790 Ft²
ASSUMED GRASS SEEDING BETWEEN EXISTING RIVER BANKS AND NEW RIVER BANKS AFTER DEMO (TYP)
ASSUMED RIVER WIDTH AFTER DAM MODIFICATION/DEMO = 200' (TYP)
A1 = 107 ACRES
71,580 Ft²
℄ RIVER (ASSUMED)
68,875 Ft²
95,237 Ft²
ASSUMED RIPRAP PROTECTION AT RIVER BENDS (TYP)
A2 = 104 ACRES
MOTTVILLE DAM
MOTTVILLE QUANTITIES
JAN 19, 2016
BY: S&L
500' 0' 500' 1000'
GRAPHIC SCALE

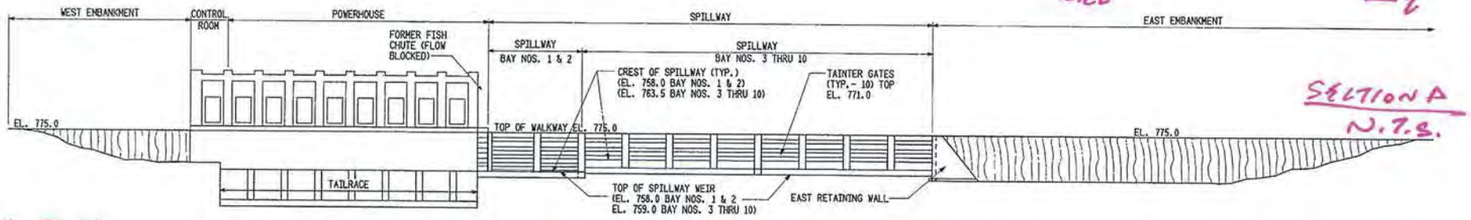
MOTTVILLE HYDRO RETIREMENT
DEMO SEQUENCE SKETCHES & CIVIL QUANTITIES
BY: S&L






PLAN

15 10 5 0 15 FEET




ELEVATION LOOKING UPSTREAM

30 20 10 0 30 FEET

SECTION A
N.T.S.

$V_{RIPRAP} = (2 \times 5)(241)\left(\frac{1}{27}\right) \approx 90\ CY$

$V_{CUT} = V_{RIPRAP} = 90\ CY$

ITEM CONCEPTUAL DEMO ESTIMATE
MOTTVILLE RETIREMENT OPTION 2
CIVIL QUANTITIES

EXHIBIT F - 1

INDIANA MICHIGAN POWER COMPANY
MOTTVILLE HYDROELECTRIC PROJECT
MOTTVILLE MICHIGAN
GENERAL DESIGN DRAWING
PLAN & ELEVATION

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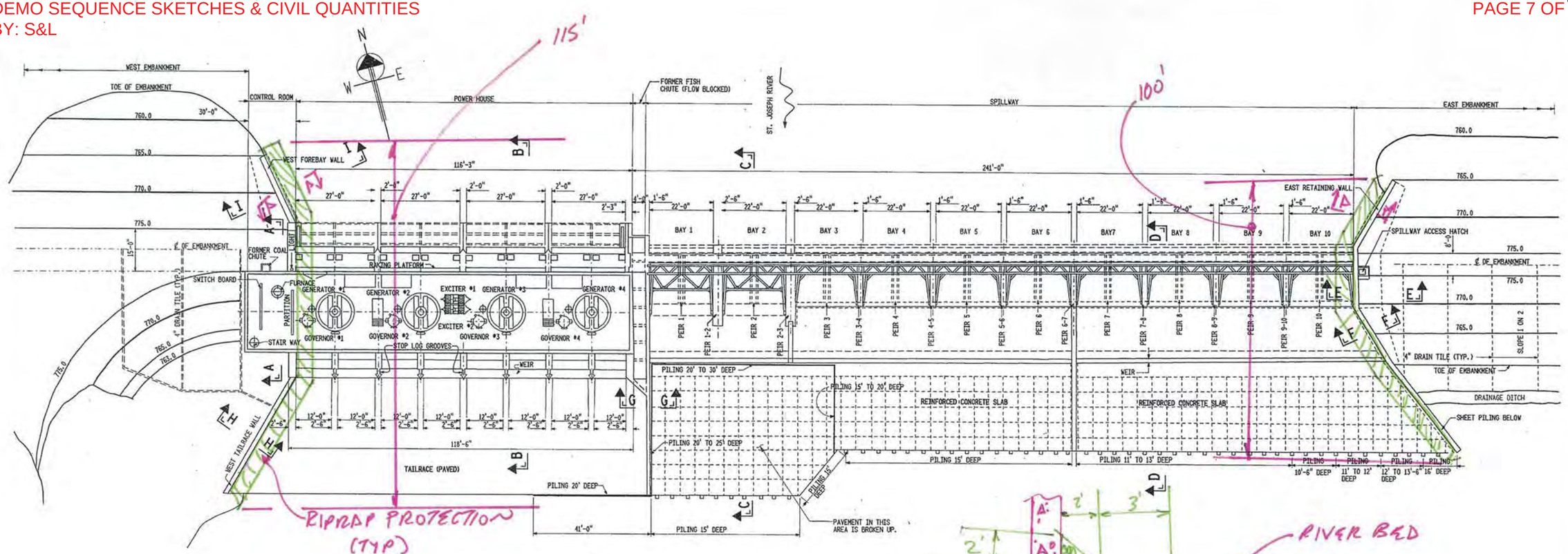
BY: _____

DATE: _____

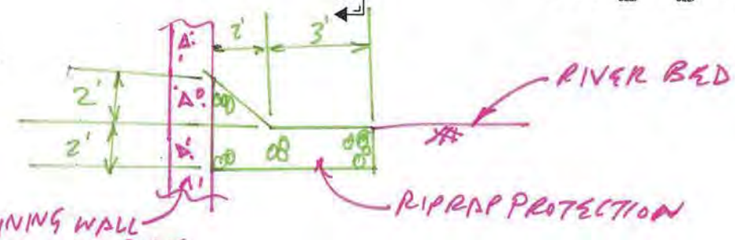
MOTTVILLE HYDRO RETIREMENT
DEMO SEQUENCE SKETCHES & CIVIL QUANTITIES
BY: S&L






PLAN

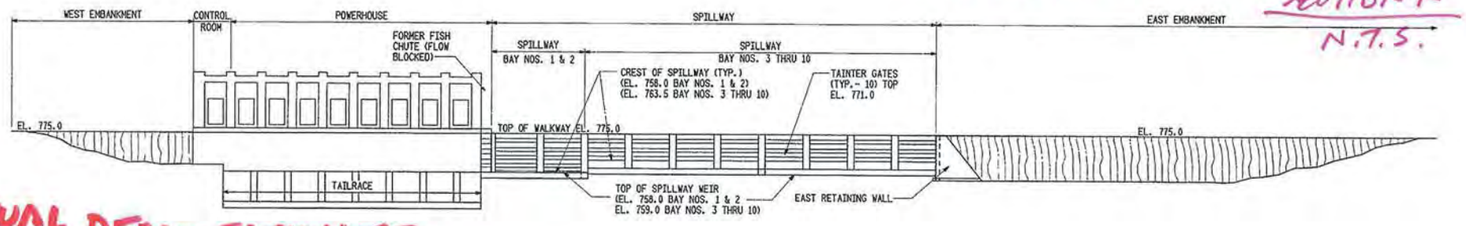
15 10 5 0 15 FEET




SECTION A
N.T.S.

$V_{RIPRAP} = (12ft^2)(115' + 110')\left(\frac{1}{27}\right) = 100\ CY$

$V_{CUT} = (2 \times 5)(115' + 110')\left(\frac{1}{27}\right) \approx 85\ CY$




ELEVATION LOOKING UPSTREAM

30 20 10 0 30 FEET

I&M CONCEPTUAL DEMO ESTIMATE
MOTTVILLE RETIREMENT OPTION 3
CIVIL QUANTITIES

EXHIBIT F - 1

INDIANA MICHIGAN POWER COMPANY
MOTTVILLE HYDROELECTRIC PROJECT
MOTTVILLE MICHIGAN
GENERAL DESIGN DRAWING
PLAN & ELEVATION

THIS DRAWING, EXHIBIT F-1, IS PART OF THE APPLICATION FOR LICENSE MADE BY INDIANA MICHIGAN POWER COMPANY

BY: _____

DATE: _____

Twin Branch Hydroelectric Plant

# CONCEPTUAL DEMOLITION COST ESTIMATE

Prepared for:
Indiana Michigan Power Company (Owner)
and American Electric Power Service Corporation

Project No. 13465-000
February 12, 2016
Revision 0

55 East Monroe Street
Chicago, IL 60603-5780 USA

# Issue Summary Page

| Revision Number | Date | Purpose | Prepared By | Reviewed By | Approved By | Pages Affected |
|---|---|---|---|---|---|---|
| A | 02/02/16 | Comments | R. C. Kinsinger | A.D. Chapin<br>D. F. Franczak | M. N. Ozan | All |
| 0 | 02/12/16 | Use | R. C. Kinsinger<br>RKinsinger RC | A.D. Chapin<br>ADChapin<br>D. F. Franczak<br>D. F. Franczak | T. J. Meehan<br>TJMeehan | All |

## TABLE OF CONTENTS

## 1.0 INTRODUCTION

The Twin Branch Hydroelectric Plant located near the City of South Bend, Indiana is owned and operated by Indiana Michigan Power Company (I&M), a subsidiary of American Electric Power (AEP). The plant consists of (from right to left referenced facing downstream) an embankment section referred to as the "saddle dike", the old steam plant intake structure, the right abutment embankment, the spillway, the powerhouse and the left abutment embankment. The spillway is a concrete-capped timber crib structure and consists of two flashboard rollway sections (on either end of the spillway) and a central tainter gate section consisting of seven (7) gates. The powerhouse is located to the left of the south rollway section. The powerhouse contains eight (8) operating vertical shaft Flygt Kaplan turbines equipped with Siemens generators rated at 0.6 MW each. Four (4) of the units were installed in 1989 and four (4) in 1992. There are two (2) in place, non-operating generators inside the powerhouse which have been abandoned.

AEP recently contracted S&L to prepare conceptual demolition cost estimates considering three (3) retirement options defined as follows: (1) Option 1, Non-Power Operation, (2) Option 2, Partial Removal of the Dam Structures, and (3) Option 3, Complete Removal of the Dam and Powerhouse. Also, in addition S&L was requested to prepare a separate Asbestos Removal Conceptual Cost Estimate.

The objective of the conceptual demolition cost estimates is to determine the gross demolition costs for Twin Branch Hydroelectric Plant (including gross salvage credits and any other benefits), in support of documenting a component of future AEP book depreciation rates to be approved by the I&M's state commissions and potential future inclusion in submittal of a rate case to the state commissions, and other potential uses. The cost estimate considers the demolition/dismantlement methodology which complies with current OSHA rules and regulations.

## 2.0 COST ESTIMATE SUMMARY

Conceptual Demolition Cost Estimate No. 33710B, dated February 12, 2016, was prepared and is included as Exhibit 2. This cost estimate was prepared for retirement option 3, but includes accounts allowing the determination of cost estimates for retirement options 1 and 2 as well. A summary of the conceptual demolition cost estimates for all three (3) retirement options is provided in Exhibit 1 and detailed in the following tables.

The cost estimate is structured into a code of accounts as identified in Table 2-1.

**Table 2-1**
**Cost Estimate Code of Accounts**

| Account Number | Description |
|---|---|
| 10, 21, 22 | Demolition Costs (including steel, equipment & piping scrap value) |
| 18 | Scrap Value Costs |
| 91 | Other Direct & Construction Indirect Costs |
| 93 | Indirect Costs |
| 94 | Contingency Costs |
| 96 | Escalation Costs |

The results of the cost estimate for retirement option 3 are provided in Table 2-2 below.

**Table 2-2**
**Cost Estimate Results Summary**
**Retirement Option 3**

| Description | Total Cost |
|---|---|
| Demolition Cost | $10,506,420 |
| Scrap Value | ($166,151) |
| Direct Cost Subtotal | $10,340,269 |
| Indirect Cost | $1,051,000 |
| Contingency Cost | $2,337,000 |
| Escalation Cost | $0 |
| Total Project Cost | $13,728,269 |

The results of the cost estimate for retirement option 1 are provided in Table 2-3 below.

**Table 2-3**
**Cost Estimate Results Summary**
**Retirement Option 1**

| Description | Total Cost |
|---|---|
| Demolition Cost | $127,208 |
| Scrap Value | ($86,961) |
| Direct Cost Subtotal | $40,247 |
| Indirect Cost | $5,000 |
| Contingency Cost | $40,000 |
| Escalation Cost | $0 |
| Total Project Cost | $85,247 |

The results of the cost estimate for retirement option 2 are provided in Table 2-4 below.

**Table 2-4**
**Cost Estimate Results Summary**
**Retirement Option 2**

| Description | Total Cost |
|---|---|
| Demolition Cost | $8,260,082 |
| Scrap Value | ($157,447) |
| Direct Cost Subtotal | $8,102,635 |
| Indirect Cost | $824,000 |
| Contingency Cost | $1,842,000 |
| Escalation Cost | $0 |
| Total Project Cost | $10,768,635 |

Asbestos Removal Conceptual Cost Estimate No. 33742B, dated February 12, 2016, was prepared and is included as Exhibit 3. The total estimated cost for asbestos removal prior to plant dismantlement is $49,330. Quantities were derived from drawings and past experience. Asbestos removal applies to the powerhouse, thus the removal cost applies to all three (3) retirement options. The cost of asbestos removal is excluded from the total conceptual demolition cost estimates for each retirement option detailed in the tables above.

## 3.0 TECHNICAL BASIS

The scope of dismantlement is based on three (3) retirement options, as requested by AEP, as follows:

Retirement Option 1, Non-Power Operation: This scenario would consider leaving intact all of the existing water-impounding structures and the powerhouse. Only the electric generating units and their auxiliary equipment would be removed so as to preclude the generation of electricity by the former hydroelectric plant. In addition, the spillway would be modified as required in order to pass river flows and maintain the impoundment's water surface elevation at the current conditions.

Retirement Option 2, Partial Removal of the Dam Structures: This scenario would consider demolition and removal of certain elements of the hydroelectric site in order to drain the existing impoundment and create a natural river channel through the dam site. This would generally include removal of the generating units and powerhouse and possibly but not inclusively demolition and removal of substantial portions of concrete spillway structures. This option would address the removal and stabilization of any sediments that have accumulated at the upstream end of the dam and the stabilization of the newly exposed reservoir/riverbanks.

Retirement Option 3, Complete Removal of the Dam and Powerhouse: This scenario would consider complete removal of the electric generating components and powerhouse and complete removal of the dam. Similar to option 2, this option would address the removal and stabilization of any sediments that have accumulated at the upstream end of the dam and the stabilization of the newly exposed reservoir/riverbanks.

The scope of dismantlement for each retirement option, as interpreted from the definitions above, are identified on marked plant drawings included as Exhibit 4. The scope of dismantlement and the sequence of demolition for each retirement option are defined on these sketches.

Retirement options 2 and 3 include the same demolition work as retirement option 1, removal of the generating unit components from the powerhouse. The powerhouse is not removed in retirement option 1, but is removed in retirement option 3. For retirement option 2 the powerhouse may or may not be removed, depending on if removal of portions of the dam can restore river flow to natural flow without removing the powerhouse (refer to Exhibit 4).

For each of the retirement options the scope of sediment removal is based on the quantity that would be disturbed from the demolition work itself and not complete removal of all sediment potentially disturbed by the partial or complete removal of the dam. The subcontractor costs included in retirement options 2 and 3 are for lime stabilization of the sediment and removal of the sediment and other wastes (such as timber) to the waste disposal site. These costs do not apply to retirement option 1 since only generating unit components in the powerhouse are removed and this material has scrap value.

Retirement options 2 and 3 include the stabilization of newly exposed riverbanks, which include the dam area and areas upstream of the dam. The extent of stabilization for retirement option 3 may be slightly more than retirement option 2, since the entire dam is being removed in retirement option 3.

The following are excluded from the scope of the conceptual demolition cost estimates:

- Asbestos removal (separate cost estimate prepared).
- The conceptual demolition cost estimate includes the cost to remove the one (1) main power transformer located in the switchyard, but not the cost to remove the switchyard itself (and remaining components in the switchyard).
- The old steam plan intake structure serves as a screen house/intake for a nearby industrial building and will remain in place.
- Evaluation of the effect of the complete removal of the series of dams on the river watershed.
- Evaluation of the effect of the removal of any one dam, on either the upstream or downstream side dam and reservoir, after removal of the dam.
- Potential social or environmental impact of the draining of the reservoirs and the impact on property values or other community impact.
- The conceptual demolition cost estimate excludes any costs related to performing surveys to quantify the amount of sediment and chemical testing of the sediment. The quantity of sediment to be removed was estimated for retirement options 2 and 3 and the cost to remove the sediment is included in the conceptual demolition cost estimate. As stated above, the scope of sediment removal is based on the quantity that would be disturbed from the demolition work itself and not

complete removal of the sediment potentially disturbed by the partial or complete removal of the dam.

The scope of the demolition cost estimate was reaffirmed during a review of the facility by two S&L employees in conjunction with a representative from Bradenburg Industrial Service Co. and AEP corporate and plant personnel. The facility review was held on Wednesday December 16, 2015.

## 4.0 COMMERCIAL BASIS

### 4.1 General Information

The Conceptual Demolition Cost Estimates prepared for the Twin Branch Hydroelectric Plant is a conceptual estimate of the cost to dismantle the powerhouse and dam in accordance with the scope defined for each of the three (3) retirement options. Costs were calculated for (1) demolition of existing plant structures and equipment and associated site restoration costs, (2) scrap value of steel, copper and stainless steel, as applicable, (3) associated indirect costs, and (4) contingency.

All units used in the cost estimate are U.S. Standard and all costs are in US Dollars (4$^{th}$ Quarter 2015 levels). A three (3) year demolition schedule is anticipated for retirement option 3 including asbestos removal (to be performed prior to start of demolition work). The schedule takes into consideration environmental permitting, asbestos removal which includes mapping out all asbestos contamination throughout the powerhouse and associated abatement, followed by total plant demolition and site restoration. The schedule for the other two (2) retirement options would be correspondingly less.

### 4.2 Quantities/Material Cost

Quantities of pieces of equipment and/or bulk material commodities used in the cost estimates were intended to be reasonable and representative of projects of this type. Material quantities were estimated from the hydroelectric plant drawings and data provided by AEP, and the information obtained from Plant personnel during the facility review.

### 4.3 Construction Labor Wages

Craft labor rates (Craft Hourly Rate) for the cost estimate were calculated as Union Labor rates for South Bend, Indiana, based on 2015, R. S. Means “Labor Rates for the Construction Industry”. The craft rates were incorporated into work crews appropriate for the activities by adding allowances for small tools, construction equipment, insurance, and site overheads to arrive at crew hourly rates detailed in the cost

estimate. A 1.10 regional labor productivity multiplier was included based on Compass International Global Construction Yearbook, 2015 Edition, for union work in Indiana. National Maintenance Agreement Rates (typically negotiated by AEP) do not apply as this work is assumed to be performed as a lump sum contract.

### 4.3.1 Labor Work Schedule and Incentives

The estimate assumed a 5x8 work week. No per diem or other labor incentives are included.

### 4.3.2 Construction Indirects

Allowances were included in the cost estimate as direct costs as noted for the following:

- Freight: Material and scrap freight included in the material and scrap costs.
- Additional Crane Allowance: None included. Cost of cranes and construction machinery are included in the labor wage rates.
- Mobilization and Demobilization: Included in labor wage rates.
- Scaffolding: Included in labor wage rates.
- Consumables: Included in material and labor costs.
- Per Diem Costs: Excluded from the estimate.
- Contractor's General and Administrative Costs and Profit: Included in the labor wage rates.

## 4.4 Scrap Value

The value of scrap was determined by a 3 month average (November and December 2015 and January 2016) using Zone 4 (USA Midwest) of the "Scrap Metals Market Watch" (www.americanrecycler.com).

Since the values obtained are delivered pieces, 25% of the values obtained were deducted to pay for separation, preparation and shipping to the mills. This resulted in realized prices of:

- Mixed Steel Value @ $118/Ton
- Copper Value @ $3,180/Ton
- Stainless Steel @ $675/Ton

Note: 1 Ton = 2,000 Lbs

All steel is considered to be mixed steel unless otherwise noted.

### 4.5 Indirect Costs

Allowances were included in the cost estimate as indirect costs as noted for the following:

- Engineering, Procurement and Project Services: None included.
- Construction Management Support: None included.
- Owners Cost: Included as 10.0% of the total direct cost. Owners Costs include owner project engineering, administration and construction management, permits and fees, legal expenses, taxes, removal of chemicals, etc.

### 4.6 Escalation

No allowance for escalation was included in the cost estimate. All costs are determined in 4$^{th}$ Quarter 2015 levels.

### 4.7 Contingency

Allowances were included in the cost estimate as contingency as noted for the following:

- Scrap Value: Included as 15.0% reduction in the salvage value resulting in a total net reduction in the salvage value. The contingency assumes a potential drop in salvage value thus increasing the project cost. Scrap costs are very volatile but by taking a 3-month average some of the effect of volatility is reduced. However there are other variables that affect scrap pricing such as the quantity and processing fees. The contingency applied is based on the estimators confidence in scrap pricing used in the demolition cost estimate.
- Material: Included as 20.0% of the total material cost.
- Labor: Included as 20.0% of the total labor cost.
- Indirect: Included as 20.0% of the total indirect cost.
- Subcontractor: Included as 20.0% of the total subcontractor cost.

### 4.8 Assumptions

The following assumptions apply to the cost estimates.

- The cost estimate for each retirement option is based on the scope and the demolition sequences defined on the sketches provided in Exhibit 4.
- All chemicals will be removed by the Owner prior to demolition, from the facilities to be demolished.

- All electrical equipment and wiring is de-energized prior to start of dismantlement, except for that required for remote operation of two (2) of the tainter gates after demolition is completed for retirement option 1.
- No extraordinary environmental costs for demolition have been included.
- Handling, on-site and off-site disposal of hazardous materials would be performed in compliance with methods approved by Owner.
- The window glazing in the powerhouse may be asbestos contaminated and an allowance for removal and disposal is included in the asbestos removal cost estimate. There are a number of devices in the powerhouse mounted on transite (asbestos) panels and an allowance for removal and disposal is included in the asbestos removal cost estimate. There is no building or pipe insulation in the facility and consequently no insulation related asbestos contamination.
- Switchyards within the plant boundaries are not part of the scope, neither are access roads to these facilities. Fences and gates needed to protect the switchyard will be left in place.
- All demolished materials are considered debris, except for organic combustibles and non-embedded metals which have scrap value.
- The basis for salvage estimating is for scrap value only. No resale of equipment or material is included.
- Sediment removed due to demolition work is treated with lime and hauled offsite to an approved waste disposal facility.

## 5.0 REFERENCES

**5.1** Twin Branch Plant Drawings: One-Line Diagrams, No. E-1000, Revision 16 and No. 16-12001-2, 2/7/91.

**5.2** Findlay Engineering, Inc., Supporting Technical Information Document, Twin Branch Hydroelectric Project, August, 2005.

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# EXHIBIT 1
# Twin Branch Hydroelectric Plant
# Conceptual Demolition Cost Estimate Summary

Twin Branch Hydroelectric Plant
Indiana Michigan Power Company
American Electric Power Service Corporation
Estimate Number: 33710B



| | Retirement Option 1 | Retirement Option 2 | Retirement Option 3 |
|---|---|---|---|
| Demolition Cost | $ 127,208 | $ 8,260,082 | $ 10,506,420 |
| Scrap Value | $ (86,961) | $ (157,447) | $ (166,151) |
| Direct Cost Subtotal | $ 40,247 | $ 8,102,635 | $ 10,340,269 |
| Indirect Cost | $ 5,000 | $ 824,000 | $ 1,051,000 |
| Contingency Cost | $ 40,000 | $ 1,842,000 | $ 2,337,000 |
| Escalation Cost | $ - | $ - | $ - |
| Total Demolition Cost | $ 85,247 | $ 10,768,635 | $ 13,728,269 |

# EXHIBIT 2
# Twin Branch Hydroelectric Plant
# Conceptual Demolition Cost Estimate No. 33710B

# AEP TWIN BRANCH
# HYDROELECTRIC PLANT DISMANTLEMENT STUDY
# CONCEPTUAL COST ESTIMATE

| | |
|---|---|
| **Client** | AEP |
| **Estimator** | RCK |
| **Labor rate table** | 15INSOU |
| **Project No.** | 13465-000 |
| **Station Name** | TWIN BRANCH |
| **Unit** | ALL |
| **Estimate Date** | 02/12/2016 |
| **Reviewed By** | ADC |
| **Approved By** | MNO |
| **Estimate No.** | 33710B |
| **Estimate Class** | Conceptual |
| **Cost index** | INSOU |

| Area | Description | Subcontract Cost | Scrap Value | Material Cost | Man Hours | Labor Cost | Total Cost |
|---|---|---|---|---|---|---|---|
| ACCOUNT A | DEMOLITION ACCOUNT A | | (86,961) | | 1,464 | 127,208 | 40,247 |
| ACCOUNT B | DEMOLITION ACCOUNT B | 1,419,180 | (70,486) | 3,177,934 | 45,622 | 3,535,760 | 8,062,388 |
| ACCOUNT C | DEMOLITION ACCOUNT C | 874,760 | (8,704) | | 15,233 | 1,371,578 | 2,237,634 |
| | TOTAL DIRECT | 2,293,940 | (166,151) | 3,177,934 | 62,319 | 5,034,546 | 10,340,269 |

## Estimate Totals

| Description | Amount | Totals | Hours |
|---|---|---|---|
| **Direct Costs:** | | | |
| Labor | 5,034,546 | | 62,319 |
| Material | 3,177,934 | | |
| Subcontract | 2,293,940 | | |
| Scrap Value | (166,151) | | |
| | **10,340,269** | **10,340,269** | |
| **Other Direct & Construction Indirect Costs:** | | | |
| 91-1 Scaffolding | | | |
| 91-2 Cost Due To OT 5-10's | | | |
| 91-3 Cost Due To OT 6-10's | | | |
| 91-4 Per Diem | | | |
| 91-5 Consumables | | | |
| 91-8 Freight on Material | | | |
| 91-9 Freight on Process Equip | | | |
| 91-10 Sales Tax | | | |
| 91-11 Contractors G&A | | | |
| 91-12 Contractors Profit | | | |
| | | **10,340,269** | |
| **Indirect Costs:** | | | |
| 93-1 Engineering Services | | | |
| 93-2 CM Support | | | |
| 93-3 Start-Up/Commissioning | | | |
| 93-4 Start-Up/Spare Parts | | | |
| 93-5 Excess Liability Insur. | | | |
| 93-6 Sales Tax On Indirects | | | |
| 93-7 Owners Cost | 1,051,000 | | |
| 93-8 EPC Fee | | | |
| | **1,051,000** | **11,391,269** | |
| **Contingency:** | | | |
| 94-1 Contingency on Material | 636,000 | | |
| 94-2 Contingency on Labor | 1,007,000 | | |
| 94-3 Contingency on Sub. | 459,000 | | |
| 94-6 Contingency on Scrap | 25,000 | | |
| 94-5 Contingency on Indirect | 210,000 | | |
| | **2,337,000** | **13,728,269** | |
| **Escalation:** | | | |
| 96-1 Escalation on Material | | | |
| 96-2 Escalation on Labor | | | |
| 96-3 Escalation on Subcontract | | | |
| 96-4 Escalation on Scrap | | | |
| 96-5 Escalation on Indirects | | | |
| | | **13,728,269** | |
| ***Total*** | | ***13,728,269*** | |

| Area | Group | Phase | Description | Notes | Quantity | Man Hours | Crew Rate | Labor Cost | Material Cost | Subcontract Cost | Scrap Value | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ACCOUNT A | | | DEMOLITION ACCOUNT A | | | | | | | | | |
| | 10.00.00 | | WHOLE PLANT DEMOLITION | | | | | | | | | |
| | | 10.31.00 | MECHANICAL EQUIPMENT | | | | | | | | | |
| | | | DEMO .6 MW FLYGT GENERATOR | 8 GENERATORS AT 9500# EA | 38.00 TN | 418 | 85.53 /MH | 35,755 | | - | | 35,755 |
| | | | DEMO FLYGT TURBINE AND GEARS | 8 GENERATORS AT 14000# EA | 56.00 TN | 616 | 85.53 /MH | 52,692 | | - | | 52,692 |
| | | | DEMO HOIZONTAL CAMELBACK GENERATOR | 2 GENERATORS AT 14000# EA | 14.00 TN | 154 | 85.53 /MH | 13,173 | | - | | 13,173 |
| | | | GENERATOR ROOM 20 TON TRAVELING CRANE | CRANE IS NOT MOTORIZED | 15.00 TN | 33 | 121.33 /MH | 4,054 | | - | | 4,054 |
| | | | BAR RACKS | 6 AT 5 TONS EACH | 30.00 TN | 67 | 121.33 /MH | 8,109 | | - | | 8,109 |
| | | | MECHANICAL EQUIPMENT | | | 1,288 | | 113,783 | | | | 113,783 |
| | | | WHOLE PLANT DEMOLITION | | | 1,288 | | 113,783 | | | | 113,783 |
| | 18.00.00 | | SCRAP VALUE | | | | | | | | | |
| | | 18.10.00 | MIXED STEEL | | | | | | | | | |
| | | | MIXED STEEL | .6 MW FLYGT GENERATOR, 8 @5,225# EA | -20.90 TN | | 79.62 /MH | | - | - | (2,468) | (2,468) |
| | | | MIXED STEEL | DEMO FLYGT TURBINE AND GEARS | -56.00 TN | | 79.62 /MH | | - | - | (6,612) | (6,612) |
| | | | MIXED STEEL | DEMO HOIZONTAL CAMELBACK GENERATOR, 2 @ 4.2 TN EA | -14.00 TN | | 79.62 /MH | | - | - | (1,653) | (1,653) |
| | | | MIXED STEEL | GENERATOR ROOM 20 TON TRAVELING CRANE | -15.00 TN | | 79.62 /MH | | - | - | (1,771) | (1,771) |
| | | | MIXED STEEL | BAR RACKS | -30.00 TN | | 79.62 /MH | | - | - | (3,542) | (3,542) |
| | | | MIXED STEEL | | | | | | | | (16,047) | (16,047) |
| | | 18.30.00 | COPPER | | | | | | | | | |
| | | | COPPER | 12 - .6 MW FLYGT GENERATOR 8@ 4,275 LB EA | -17.10 TN | | 79.62 /MH | | - | - | (54,378) | (54,378) |
| | | | COPPER | DEMO HOIZONTAL CAMELBACK GENERATOR, 2 @ 2.6 TN EA | -5.20 TN | | 79.62 /MH | | - | - | (16,536) | (16,536) |
| | | | COPPER | | | | | | | | (70,914) | (70,914) |
| | | | SCRAP VALUE | | | | | | | | (86,961) | (86,961) |
| | 22.00.00 | | CONCRETE | | | | | | | | | |
| | | 22.13.00 | Concrete | | | | | | | | | |
| | | | FLOWABLE FILL, 1500 PSI | INSTALL COVER PLATES IN TURBINE BAY TO PREVENT BYPASS FLOW | 1.00 LT | 176 | 76.27 /MH | 13,425 | | - | - | 13,425 |
| | | | Concrete | | | 176 | | 13,425 | | | | 13,425 |
| | | | CONCRETE | | | 176 | | 13,425 | | | | 13,425 |
| | | | ACCOUNT A DEMOLITION ACCOUNT A | | | 1,464 | | 127,208 | | | (86,961) | 40,247 |
| ACCOUNT B | | | DEMOLITION ACCOUNT B | | | | | | | | | |
| | 10.00.00 | | WHOLE PLANT DEMOLITION | | | | | | | | | |
| | | 10.22.00 | CONCRETE | | | | | | | | | |
| | | | EQUIPMENT/ BUILDING FOUNDATION | TAINTER GATE SECTION: WEIR, , GATE WALLS & OGEE | 1,522.00 CY | 1,884 | 89.94 /MH | 169,417 | | - | - | 169,417 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | NORTH ROLLWAY SECTION - TIMBER CRIBING, INCL DISPOSAL | 3,428.00 CY | 3,394 | 89.94 /MH | 305,262 | | 68,560 | - | 373,822 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | NORTH ROLLWAY SECTION - CONCRETE OGIVE | 457.00 CY | 566 | 89.94 /MH | 50,870 | | - | - | 50,870 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | SOUTH ROLLWAY SECTION - TIMBER CRIBBING INCLUDES DISPOSAL; | 3,360.00 CY | 3,327 | 89.94 /MH | 299,206 | | 67,200 | - | 366,406 |
| | | | CONCRETE | | | 9,170 | | 824,754 | | 135,760 | | 960,514 |
| | | 10.23.00 | STEEL | | | | | | | | | |
| | | | STRUCTURAL AND GIRT STEEL | NORTH ROLLWAY WALKWAY | 10.00 TN | 11 | 79.62 /MH | 890 | | - | - | 890 |
| | | | STRUCTURAL AND GIRT STEEL | SOUTH ROLLWAY WALKWAY | 10.00 TN | 11 | 79.62 /MH | 890 | | - | - | 890 |
| | | | STRUCTURAL AND GIRT STEEL | GENERATOR HOUSE | 89.00 TN | 99 | 79.62 /MH | 7,920 | | - | - | 7,920 |
| | | | STEEL | | | 122 | | 9,700 | | | | 9,700 |
| | | 10.31.00 | MECHANICAL EQUIPMENT | | | | | | | | | |
| | | | 60 KW PROPANE ELECTRIC GENERATOR | | 1.50 TN | 3 | 121.33 /MH | 405 | | - | | 405 |
| | | | TAINTER GATES | 7 AT 5 TONS EACH | 35.00 TN | 78 | 121.33 /MH | 9,460 | | - | | 9,460 |
| | | | MECHANICAL EQUIPMENT | | | 81 | | 9,866 | | | | 9,866 |
| | | 10.41.00 | ELECTRICAL EQUIPMENT | | | | | | | | | |
| | | | GENERATOR BUS TRANSFORMERS | 4.16 to 34.5 KV, 7500/9375 KVA (STEEL) | 5.12 TN | 15 | 80.14 /MH | 1,206 | | - | - | 1,206 |
| | | | GENERATOR BUS TRANSFORMERS | 4.16 to 34.5 KV, 6800/9068 KVA (CU) | 4.62 TN | 14 | 80.14 /MH | 1,088 | | - | - | 1,088 |
| | | | MISCELLANEOUS ELECTRICAL EQUIPMENT | | 5.00 TN | 15 | 80.14 /MH | 1,178 | | - | - | 1,178 |
| | | | ELECTRICAL EQUIPMENT | | | 43 | | 3,472 | | | | 3,472 |

| Area | Group | Phase | Description | Notes | Quantity | Man Hours | Crew Rate | Labor Cost | Material Cost | Subcontract Cost | Scrap Value | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | WHOLE PLANT DEMOLITION | | | 9,417 | | 847,792 | | 135,760 | | 983,552 |
| | 18.00.00 | | SCRAP VALUE | | | | | | | | | |
| | | 18.10.00 | MIXED STEEL | | | | | | | | | |
| | | | MIXED STEEL | 60 KW PROPANE ELECTRIC GENERATOR | -1.50 TN | | 79.62 /MH | | - | - | (177) | (177) |
| | | | MIXED STEEL | TAINTER GATES AND WALKWAY | -35.00 TN | | 79.62 /MH | | - | - | (4,133) | (4,133) |
| | | | MIXED STEEL | GENERATOR BUS TRANSFORMERS | -5.12 TN | | 79.62 /MH | | - | - | (605) | (605) |
| | | | MIXED STEEL | | | | | | | | (4,914) | (4,914) |
| | | 18.30.00 | COPPER | | | | | | | | | |
| | | | COPPER | CABLE | -10.00 TN | | 79.62 /MH | | - | - | (31,800) | (31,800) |
| | | | COPPER | MISC. TRANSFORMERS & MOTORS UNIT 1 | -6.00 TN | | 79.62 /MH | | - | - | (19,080) | (19,080) |
| | | | COPPER | GENERATOR BUS TRANSFORMERS | -4.62 TN | | 79.62 /MH | | - | - | (14,692) | (14,692) |
| | | | COPPER | | | | | | | | (65,572) | (65,572) |
| | | | SCRAP VALUE | | | | | | | | (70,486) | (70,486) |
| | 21.00.00 | | CIVIL WORK | | | | | | | | | |
| | | 21.17.00 | Earthwork, Excavation | | | | | | | | | |
| | | | FOUNDATION EXCAVATION, COMMON EARTH USING 1 CY BACKHOE | RIVERBED EXCAVATION FOR RIPRAP | 170.00 CY | 28 | 88.08 /MH | 2,471 | | - | - | 2,471 |
| | | | Earthwork, Excavation | | | 28 | | 2,471 | | | | 2,471 |
| | | 21.41.00 | Erosion and Sedimentation Control | | | | | | | | | |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | 54560CY - 7333CY ASSUMING REUSE OF CAUSEWAY STONE | 47,227.00 CY | 20,834 | 74.10 /MH | 1,543,793 | 1,931,584 | - | - | 3,475,377 |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | FOR CAUSEWAYS INSTALLATION | 7,333.00 CY | 3,235 | 74.10 /MH | 239,707 | 299,920 | - | - | 539,627 |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | REUSE CAUSEWAY RIP RAP FOR BANK PROTECTION | 7,333.00 CY | 3,235 | 74.10 /MH | 239,707 | | - | - | 239,707 |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | RIP RAP PROTECTION AT SPILLWAY FLOOR SLAB | 170.00 CY | 75 | 74.10 /MH | 5,557 | | - | - | 5,557 |
| | | | Erosion and Sedimentation Control | | | 27,379 | | 2,028,764 | 2,231,504 | | | 4,260,268 |
| | | 21.47.00 | LANDSCAPING | | | | | | | | | |
| | | | HYDRO OR AIR SEED & MULCH & FERTILIZER | | 620.00 AC | 8,799 | 74.64 /MH | 656,733 | 946,430 | - | - | 1,603,163 |
| | | | LANDSCAPING | | | 8,799 | | 656,733 | 946,430 | | | 1,603,163 |
| | | 21.65.00 | Soil Remediation | | | | | | | | | |
| | | | REMOVAL OF SOIL - LOCALIZED | LIME ADDITIVE FOR DRYING | 5,834.00 CY | | 196.64 /MH | | | 233,360 | - | 233,360 |
| | | | REMOVAL OF SOIL - LOCALIZED | LOAD, MIX AND HAUL LIME AND SEDIMENT MIX 7111+3556 | 17,501.00 CY | | 196.64 /MH | | | 1,050,060 | - | 1,050,060 |
| | | | Soil Remediation | | | | | | | 1,283,420 | | 1,283,420 |
| | | | CIVIL WORK | | | 36,205 | | 2,687,968 | 3,177,934 | 1,283,420 | | 7,149,322 |
| | | | ACCOUNT B DEMOLITION ACCOUNT B | | | 45,622 | | 3,535,760 | 3,177,934 | 1,419,180 | (70,486) | 8,062,388 |
| ACCOUNT C | | | DEMOLITION ACCOUNT C | | | | | | | | | |
| | 10.00.00 | | WHOLE PLANT DEMOLITION | | | | | | | | | |
| | | 10.22.00 | CONCRETE | | | | | | | | | |
| | | | EQUIPMENT/ BUILDING FOUNDATION | TAINTER GATE: APRON | 838.00 CY | 1,037 | 89.94 /MH | 93,279 | | - | - | 93,279 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | NORTH ROLLWAY SECTION - CONCRETE BASE | 488.00 CY | 604 | 89.94 /MH | 54,320 | | - | - | 54,320 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | NORTH ROLLWAY SECTION - PLANK APRON, INCL DISPOSAL | 480.00 CY | 475 | 89.94 /MH | 42,744 | | 9,600 | - | 52,344 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | SOUTH ROLLWAY SECTION - CONCRETE BASE | 471.00 CY | 583 | 89.94 /MH | 52,428 | | - | - | 52,428 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | SOUTH ROLLWAY SECTION - PLANK APRON, INCL DISPOSAL | 3,360.00 CY | 3,327 | 89.94 /MH | 299,206 | | 67,200 | - | 366,406 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | GENERATOR ROOM | 1,723.00 CY | 2,132 | 89.94 /MH | 191,790 | | - | - | 191,790 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | TURBINE BAY | 1,913.00 CY | 2,368 | 89.94 /MH | 212,940 | | - | - | 212,940 |
| | | | EQUIPMENT/ BUILDING FOUNDATION | DRAFT TUBE TUNNEL | 2,266.00 CY | 2,804 | 89.94 /MH | 252,233 | | - | - | 252,233 |
| | | | CONCRETE | | | 13,330 | | 1,198,940 | | 76,800 | | 1,275,740 |
| | | 10.24.00 | ARCHITECTURAL | | | | | | | | | |
| | | | GENERATOR HOUSE | 40'X181' | 353,600.00 CF | 1,517 | 89.81 /MH | 136,250 | | - | - | 136,250 |
| | | | ARCHITECTURAL | | | 1,517 | | 136,250 | | | | 136,250 |
| | | 10.31.00 | MECHANICAL EQUIPMENT | | | | | | | | | |
| | | | DEMO CAMELBACK PENSTOCKS | 2 GENERATORS AT 15 TN EA | 30.00 TN | 330 | 85.53 /MH | 28,228 | | - | | 28,228 |
| | | | STOP LOGS | 6 AT 5 TONS EACH | 30.00 TN | 67 | 121.33 /MH | 8,109 | | - | | 8,109 |

| Area | Group | Phase | Description | Notes | Quantity | Man Hours | Crew Rate | Labor Cost | Material Cost | Subcontract Cost | Scrap Value | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 10.31.00 | MECHANICAL EQUIPMENT | | | | | | | | | |
| | | | TURBINE ROOM 15 TON GANTRY CRANE | INTAKE DECK | 10.00 TN | 22 | 121.33 /MH | 2,703 | | - | | 2,703 |
| | | | MECHANICAL EQUIPMENT | | | 419 | | 39,039 | | | | 39,039 |
| | | 10.86.00 | WASTE | | | | | | | | | |
| | | | WASTE | MISC | 1.00 LS | | 121.33 /MH | | | - | 10,000 | 10,000 |
| | | | WASTE | | | | | | | | 10,000 | 10,000 |
| | | | WHOLE PLANT DEMOLITION | | | 15,267 | | 1,374,230 | | 76,800 | 10,000 | 1,461,030 |
| | 18.00.00 | | SCRAP VALUE | | | | | | | | | |
| | | 18.10.00 | MIXED STEEL | | | | | | | | | |
| | | | MIXED STEEL | DEMO CAMELBACK PENSTOCKS | -30.00 TN | | 79.62 /MH | | - | - | (3,542) | (3,542) |
| | | | MIXED STEEL | STOP LOGS | -30.00 TN | | 79.62 /MH | | - | - | (3,542) | (3,542) |
| | | | MIXED STEEL | TURBINE ROOM 15 TON GANTRY CRANE | -10.00 TN | | 79.62 /MH | | - | - | (1,181) | (1,181) |
| | | | MIXED STEEL | GENERATOR HOUSE | -88.40 TN | | 79.62 /MH | | - | - | (10,438) | (10,438) |
| | | | MIXED STEEL | | | | | | | | (18,704) | (18,704) |
| | | | SCRAP VALUE | | | | | | | | (18,704) | (18,704) |
| | 21.00.00 | | CIVIL WORK | | | | | | | | | |
| | | 21.17.00 | Earthwork, Excavation | | | | | | | | | |
| | | | FOUNDATION EXCAVATION, COMMON EARTH USING 1 CY BACKHOE | RIVERBED EXCAVATION FOR RIPRAP CREDIT (170-100_ | -70.00 CY | -12 | 88.08 /MH | (1,017) | | - | - | (1,017) |
| | | | Earthwork, Excavation | | | -12 | | (1,017) | | | | (1,017) |
| | | 21.41.00 | Erosion and Sedimentation Control | | | | | | | | | |
| | | | RIPRAP, RANDOM BROKEN STONE, MACHINE PLACED | RIP RAP PROTECTION AT RETAINING WALLS CEDIT(170-120) | -50.00 CY | -22 | 74.10 /MH | (1,634) | | - | - | (1,634) |
| | | | Erosion and Sedimentation Control | | | -22 | | (1,634) | | | | (1,634) |
| | | 21.65.00 | Soil Remediation | | | | | | | | | |
| | | | REMOVAL OF SOIL - LOCALIZED | ADDITIONAL LIME ADDITIVE FOR DRYING ACCOUNT (9463-5834) | 3,629.00 CY | | 196.64 /MH | | | 145,160 | - | 145,160 |
| | | | REMOVAL OF SOIL - LOCALIZED | ADDITIONAL LOAD, MIX AND HAUL LIME AND SEDIMENT MIX (28389-17501)) | 10,880.00 CY | | 196.64 /MH | | | 652,800 | - | 652,800 |
| | | | Soil Remediation | | | | | | | 797,960 | | 797,960 |
| | | | CIVIL WORK | | | -34 | | (2,652) | | 797,960 | | 795,308 |
| | | | ACCOUNT C DEMOLITION ACCOUNT C | | | 15,233 | | 1,371,578 | | 874,760 | (8,704) | 2,237,634 |

# EXHIBIT 3
# Twin Branch Hydroelectric Plant
# Asbestos Removal Conceptual Cost Estimate No. 33742B

# AEP TWIN BRANCH
# HYDROELECTRIC PLANT DISMANTLEMENT STUDY - ASBESTOS REMOVAL
# CONCEPTUAL COST ESTIMATE

| | |
|---|---|
| **Client** | AEP |
| **Estimator** | RCK |
| **Labor rate table** | 15INSOU |
| **Project No.** | 13465-000 |
| **Station Name** | TWIN BRANCH |
| **Unit** | ALL |
| **Estimate Date** | 02/12/2016 |
| **Reviewed By** | ADC |
| **Approved By** | MNO |
| **Estimate No.** | 33742B |
| **Estimate Class** | Conceptual |
| **Cost index** | INSOU |

**AEP TWIN BRANCH**
**HYDROELECTRIC PLANT DISMANTLEMENT STUDY - ASBESTOS REMOVAL**
**CONCEPTUAL COST ESTIMATE**



| Area | Description | Subcontract Cost | Scrap Value | Material Cost | Man Hours | Labor Cost | Total Cost |
|---|---|---|---|---|---|---|---|
| ASBESTOS | ASBESTOS REMOVAL | 37,430 | | | | | 37,430 |
| | TOTAL DIRECT | 37,430 | | | | | 37,430 |

## Estimate Totals

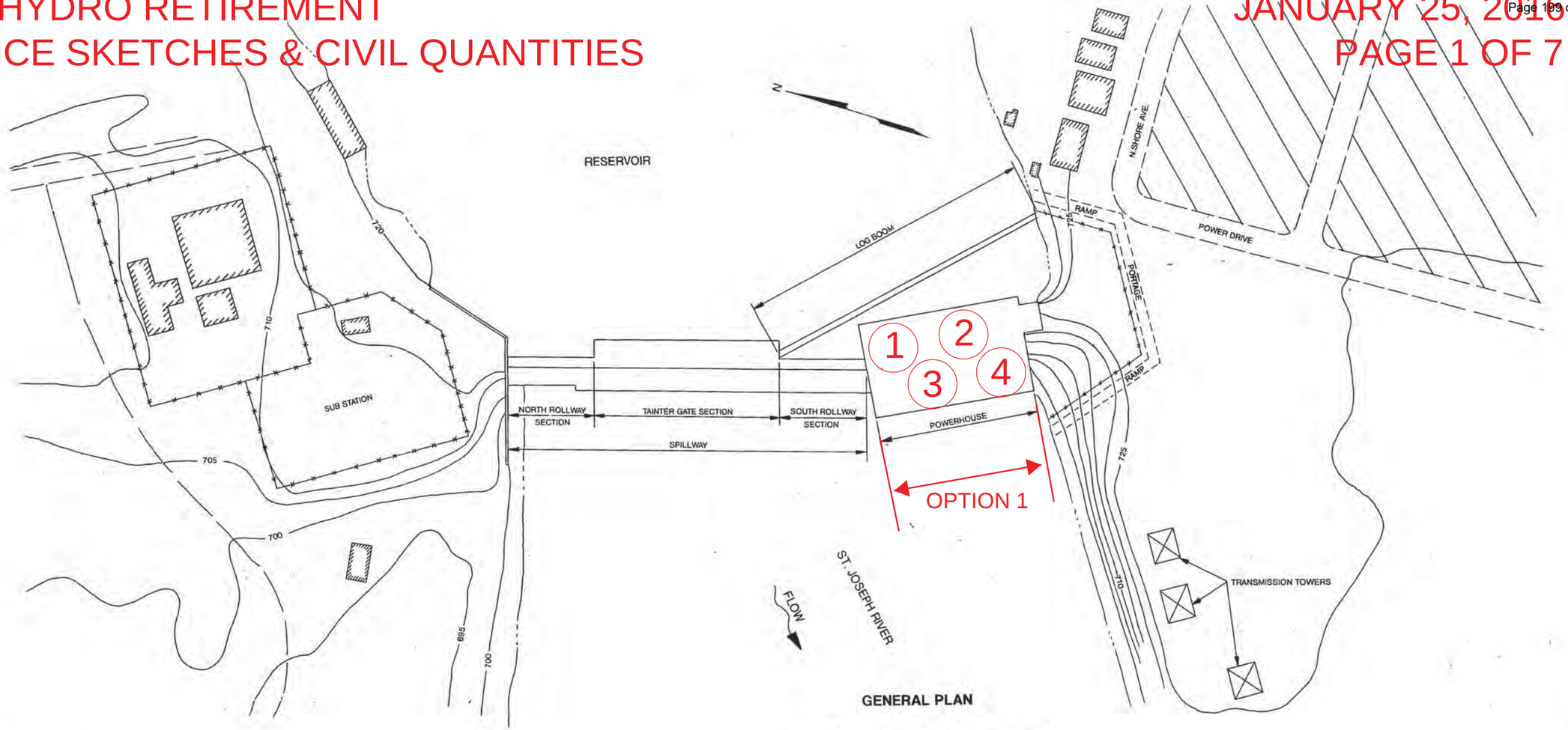
| Description | Amount | Totals | Hours |
|---|---|---|---|
| **Direct Costs:** | | | |
| Labor | | | |
| Material | | | |
| Subcontract | 37,430 | | |
| Scrap Value | | | |
| | **37,430** | **37,430** | |
| **Other Direct & Construction** | | | |
| **Indirect Costs:** | | | |
| 91-1 Scaffolding | | | |
| 91-2 Cost Due To OT 5-10's | | | |
| 91-3 Cost Due To OT 6-10's | | | |
| 91-4 Per Diem | | | |
| 91-5 Consumables | | | |
| 91-8 Freight on Material | | | |
| 91-9 Freight on Process Equip | | | |
| 91-10 Sales Tax | | | |
| 91-11 Contractors G&A | | | |
| 91-12 Contractors Profit | | | |
| | | **37,430** | |
| **Indirect Costs:** | | | |
| 93-1 Engineering Services | | | |
| 93-2 CM Support | | | |
| 93-3 Start-Up/Commissioning | | | |
| 93-4 Start-Up/Spare Parts | | | |
| 93-5 Excess Liability Insur. | | | |
| 93-6 Sales Tax On Indirects | | | |
| 93-7 Owners Cost | 3,700 | | |
| 93-8 EPC Fee | | | |
| | **3,700** | **41,130** | |
| **Contingency:** | | | |
| 94-1 Contingency on Material | | | |
| 94-2 Contingency on Labor | | | |
| 94-3 Contingency on Sub. | 7,500 | | |
| 94-6 Contingency on Scrap | | | |
| 94-5 Contingency on Indirect | 700 | | |
| | **8,200** | **49,330** | |
| **Escalation:** | | | |
| 96-1 Escalation on Material | | | |
| 96-2 Escalation on Labor | | | |
| 96-3 Escalation on Subcontract | | | |
| 96-4 Escalation on Scrap | | | |
| 96-5 Escalation on Indirects | | | |
| | | **49,330** | |
| ***Total*** | | ***49,330*** | |

| Area | Group | Phase | Description | Notes | Quantity | Man Hours | Crew Rate | Labor Cost | Material Cost | Subcontract Cost | Scrap Value | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ASBESTOS | | | ASBESTOS REMOVAL/DISPOSAL | | | | | | | | | |
| | 10.00.00 | | WHOLE PLANT DEMOLITION | | | | | | | | | |
| | | 10.37.00 | ASBESTOS REMOVAL | | | | | | | | | |
| | | | ASBESTOS REMOVAL - MISC MATERIALS | WINDOW CAULKING MISC MATERIALS | 2.00 CY | | 121.33 /MH | | | 3,800 | - | 3,800 |
| | | | ASBESTOS REMOVAL - MISC MATERIALS | CONTROL PANEL APPROX 20' X 9' TALL | 6.70 CY | | 121.33 /MH | | | 12,730 | - | 12,730 |
| | | | ASBESTOS REMOVAL - MISC MATERIALS | SWITCHBOARDS | 2.00 CY | | 121.33 /MH | | | 3,800 | - | 3,800 |
| | | | ASBESTOS REMOVAL - MISC MATERIALS | UNIDENTIFIED ABANDONED EQUIPMENT | 9.00 CY | | 121.33 /MH | | | 17,100 | - | 17,100 |
| | | | ASBESTOS REMOVAL | | | | | | | 37,430 | | 37,430 |
| | | | WHOLE PLANT DEMOLITION | | | | | | | 37,430 | | 37,430 |
| | | | ASBESTOS ASBESTOS REMOVAL/DISPOSAL | | | | | | | 37,430 | | 37,430 |

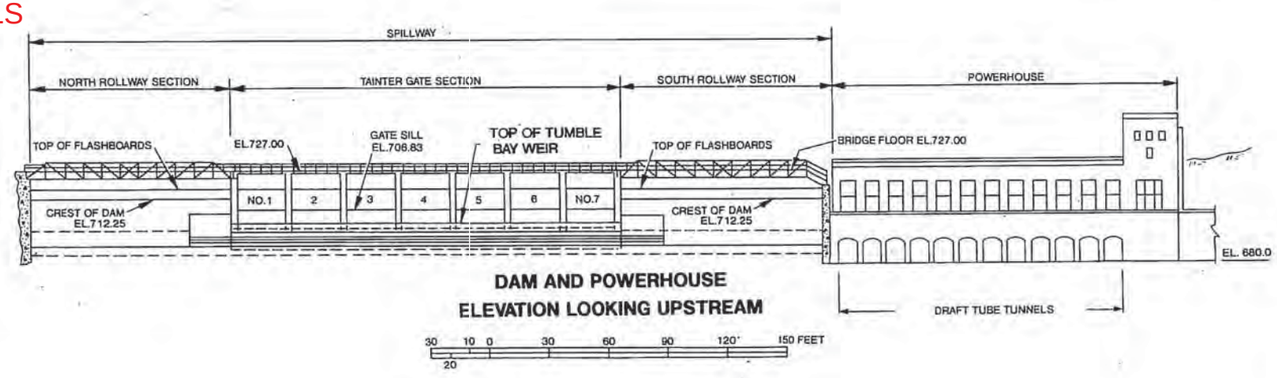
# EXHIBIT 4
# Twin Branch Hydroelectric Plant
# Retirement Option 1-3 Demolition Scope and Sequence

# TWIN BRANCH HYDRO RETIREMENT
# DEMO SEQUENCE SKETCHES & CIVIL QUANTITIES
# BY: S&L

JANUARY 25, 2016
PAGE 1 OF 7




OPTION 1
①INSTALL STOPLOGS
②REMOVE EQUIPMENT
③GROUT DRAFT TUBE TUNNELS
④REMOVE STOPLOGS




THIS DRAWING, EXHIBIT F, IS A PART OF THE APPLICATION FOR LICENSE MADE BY INDIANA MICHIGAN POWER COMPANY

BY B.H. Brandt

DATE 10/31/91

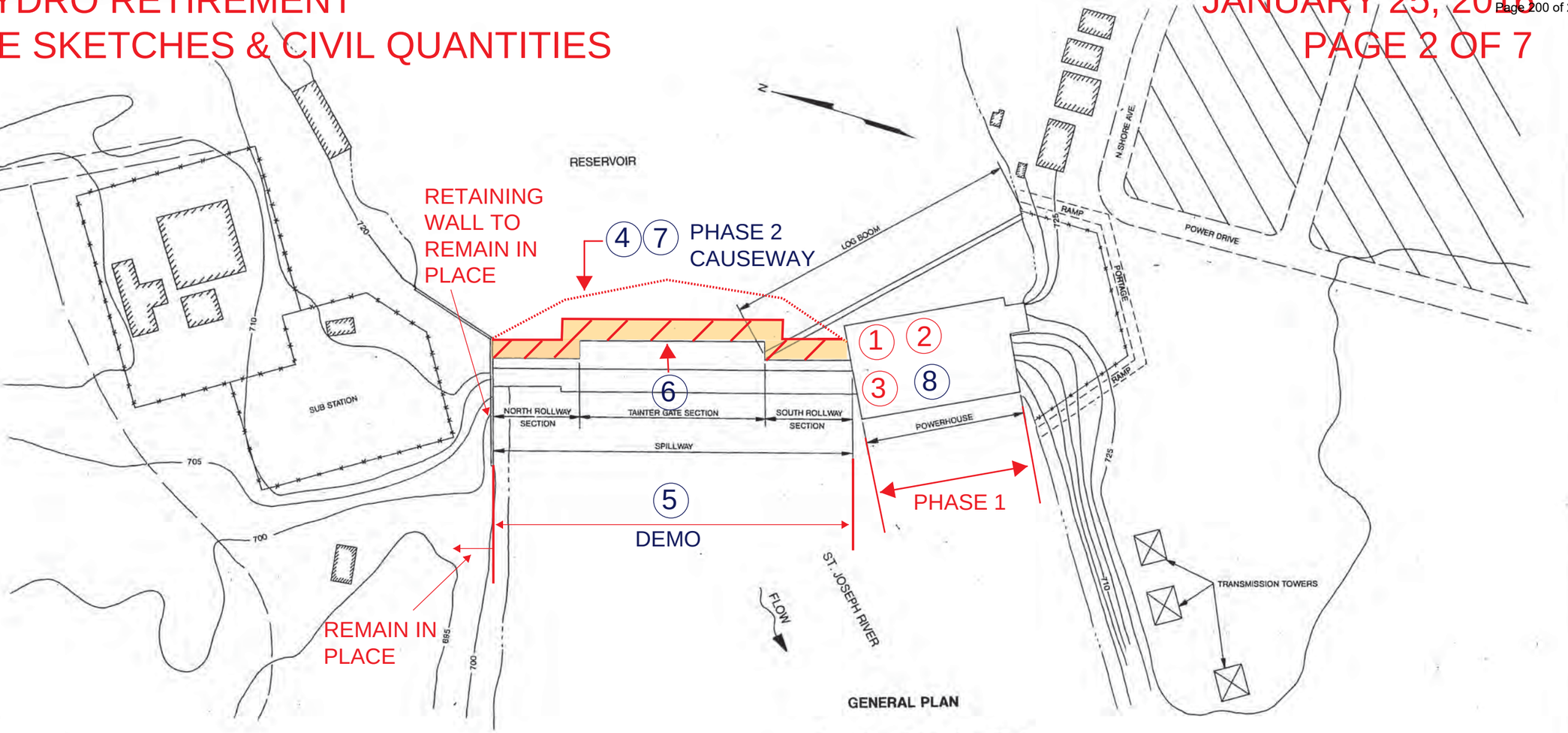
EXHIBIT F SHEET 1 OF 3

INDIANA MICHIGAN POWER COMPANY
**TWIN BRANCH**
**HYDROELECTRIC PROJECT NO.2579**
GENERAL DESIGN DRAWINGS
PLAN AND ELEVATION

FERC NO. 2579 - 010 - 1

# TWIN BRANCH HYDRO RETIREMENT
# DEMO SEQUENCE SKETCHES & CIVIL QUANTITIES
# BY: S&L

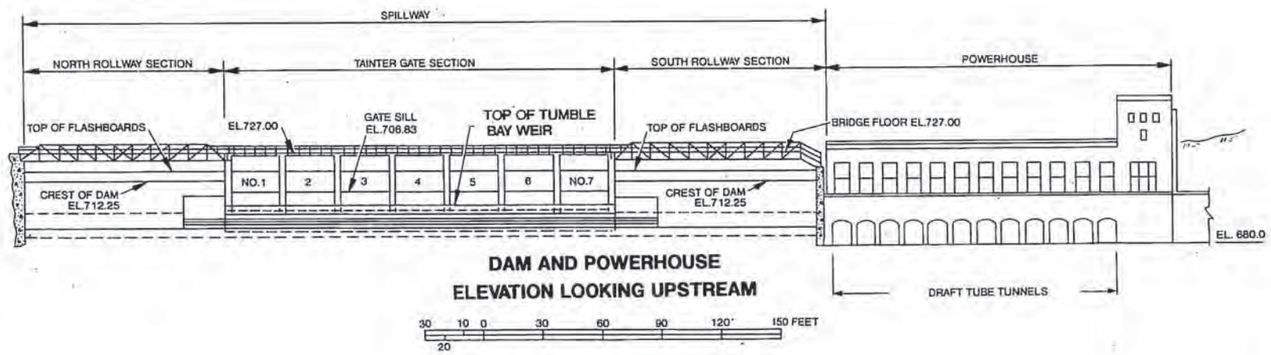
JANUARY 25, 2016
PAGE 2 OF 7




GENERAL PLAN

0 50 100 150 200 FEET

## OPTION 2




DAM AND POWERHOUSE
ELEVATION LOOKING UPSTREAM

30 20 10 0 30 60 90 120' 150 FEET

PHASE 1
①INSTALL STOPLOGS
②REMOVE EQUIPMENT
③REMOVE STOPLOGS

PHASE 2
④CONSTRUCT CAUSEWAY
⑤DEMO TAINTER GATE AND ROLLWAY SECTIONS
⑥PLACE RIPRAP PROTECTION
⑦REMOVE CAUSEWAY
⑧GROUT DRAFT TUBES

THIS DRAWING, EXHIBIT F, IS A PART OF THE APPLICATION FOR LICENSE MADE BY INDIANA MICHIGAN POWER COMPANY

BY B.H. Bonnell

DATE 10/31/91

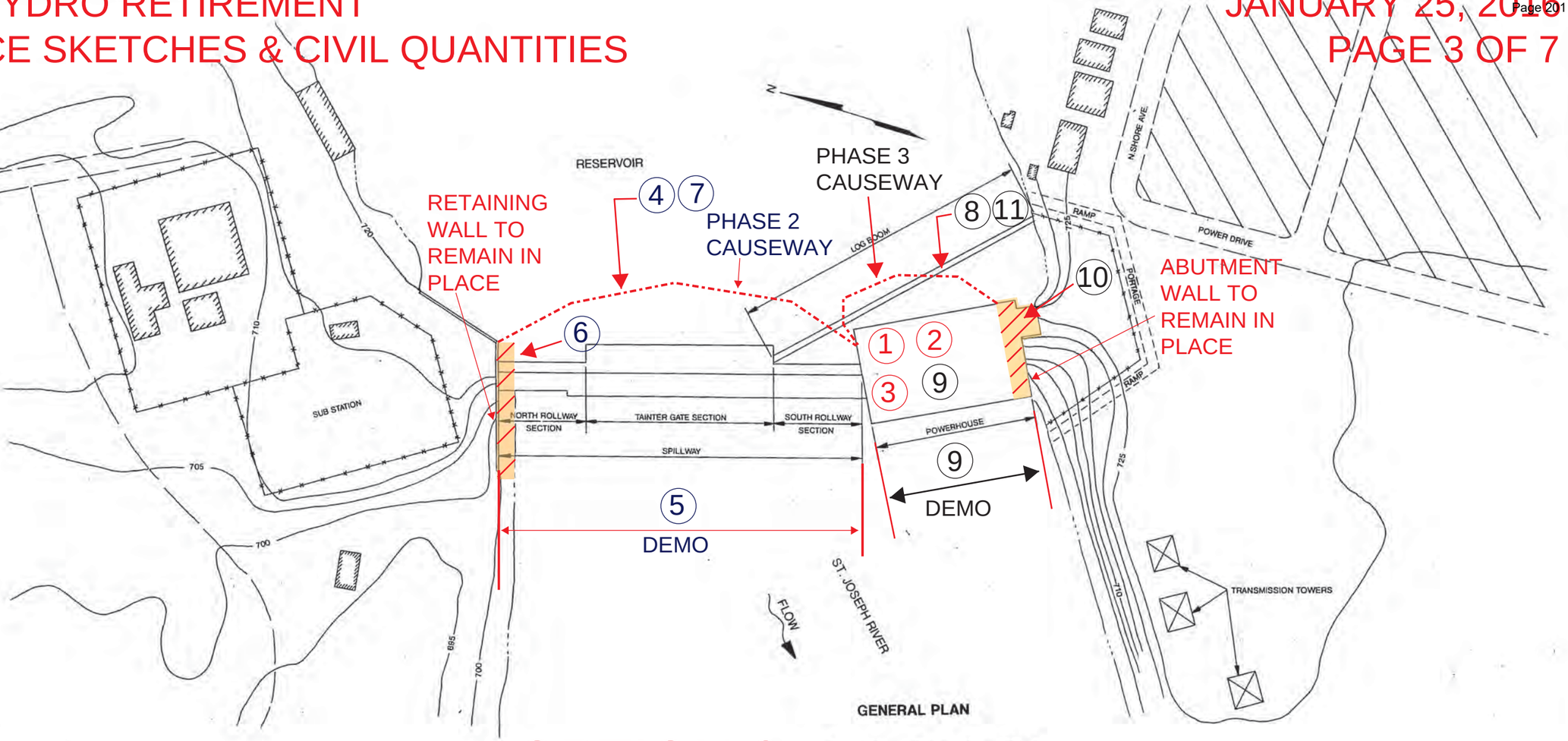
EXHIBIT F SHEET 1 OF 3

INDIANA MICHIGAN POWER COMPANY
**TWIN BRANCH**
**HYDROELECTRIC PROJECT NO.2579**
GENERAL DESIGN DRAWINGS
**PLAN AND ELEVATION**

FERC NO. 2579 – 010 – 1

# TWIN BRANCH HYDRO RETIREMENT
# DEMO SEQUENCE SKETCHES & CIVIL QUANTITIES
# BY: S&L

JANUARY 25, 2020
PAGE 3 OF 7




GENERAL PLAN

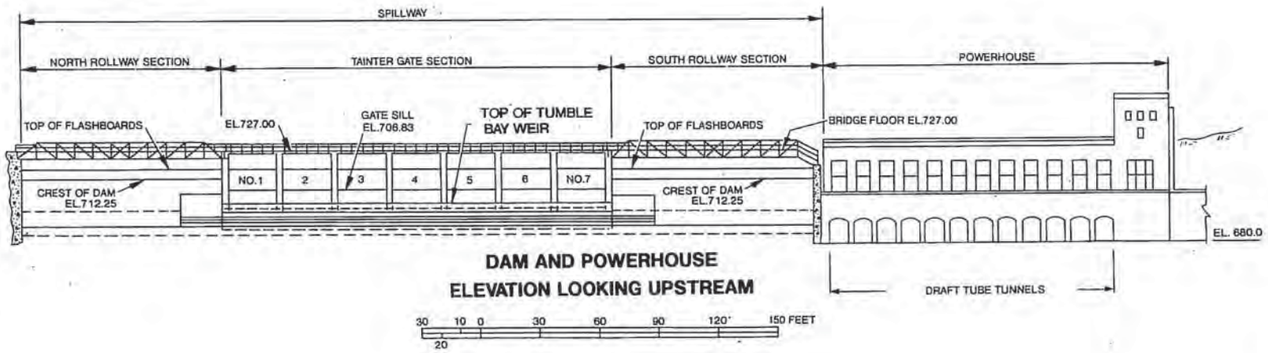
0 50 100 150 200 FEET

# OPTION 3

PHASE 1
①INSTALL STOPLOGS
②REMOVE EQUIPMENT
③REMOVE STOPLOGS

PHASE 2
④CONSTRUCT CAUSEWAY
⑤DEMO TAINTER GATE AND ROLLWAY SECTIONS
⑥PLACE RIPRAP PROTECTION AT RETAINING WALL
⑦REMOVE CAUSEWAY

PHASE 3
⑧ CONSTRUCT CAUSEWAY
⑨ DEMO POWERHOUSE
⑩ PLACE RIPRAP PROTECTION AT ABUTMENT WALL
⑪ REMOVE CAUSEWAY




DAM AND POWERHOUSE
ELEVATION LOOKING UPSTREAM

30 10 0 30 60 90 120' 150 FEET
20

THIS DRAWING, EXHIBIT F, IS A PART OF THE APPLICATION FOR LICENSE MADE BY INDIANA MICHIGAN POWER COMPANY

BY B.H. Bonnell

DATE 10/31/91

EXHIBIT F SHEET 1 OF 3

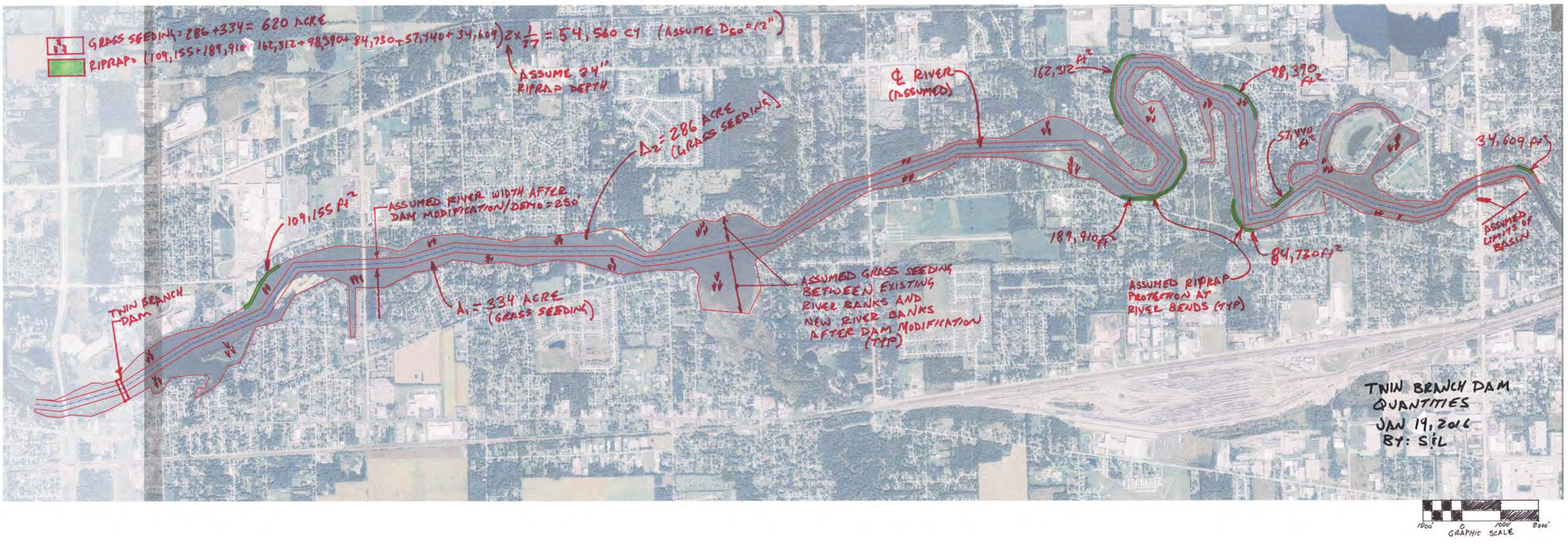
INDIANA MICHIGAN POWER COMPANY
**TWIN BRANCH**
**HYDROELECTRIC PROJECT NO.2579**
GENERAL DESIGN DRAWINGS
**PLAN AND ELEVATION**

FERC NO. 2579 – 010 – 1

Indiana Michigan Power Company
Attachment JAC-3
Witness; Cash
Page 202 of 205

| TWIN BRANCH | | | |
|---|---|---|---|
| OPTION 2 | | | |
| ITEM | QUANTITY | UNIT | REMARKS |
| GRASS SEEDING | 620 | ACRE | |
| RIPRAP PROTECTION | 54,560 | CY | 2 ft riprap protection @ D(50)=12" |
| RIVERBED EXCAVATION FOR RIPRAP | 170 | CY | TO BE REPLACED BY RIPRAP |
| RIPRAP PROTECTION AT SPILLWAY FLOOR SLAB | 170 | CY | 2 ft riprap protection @ D(50)=12" |

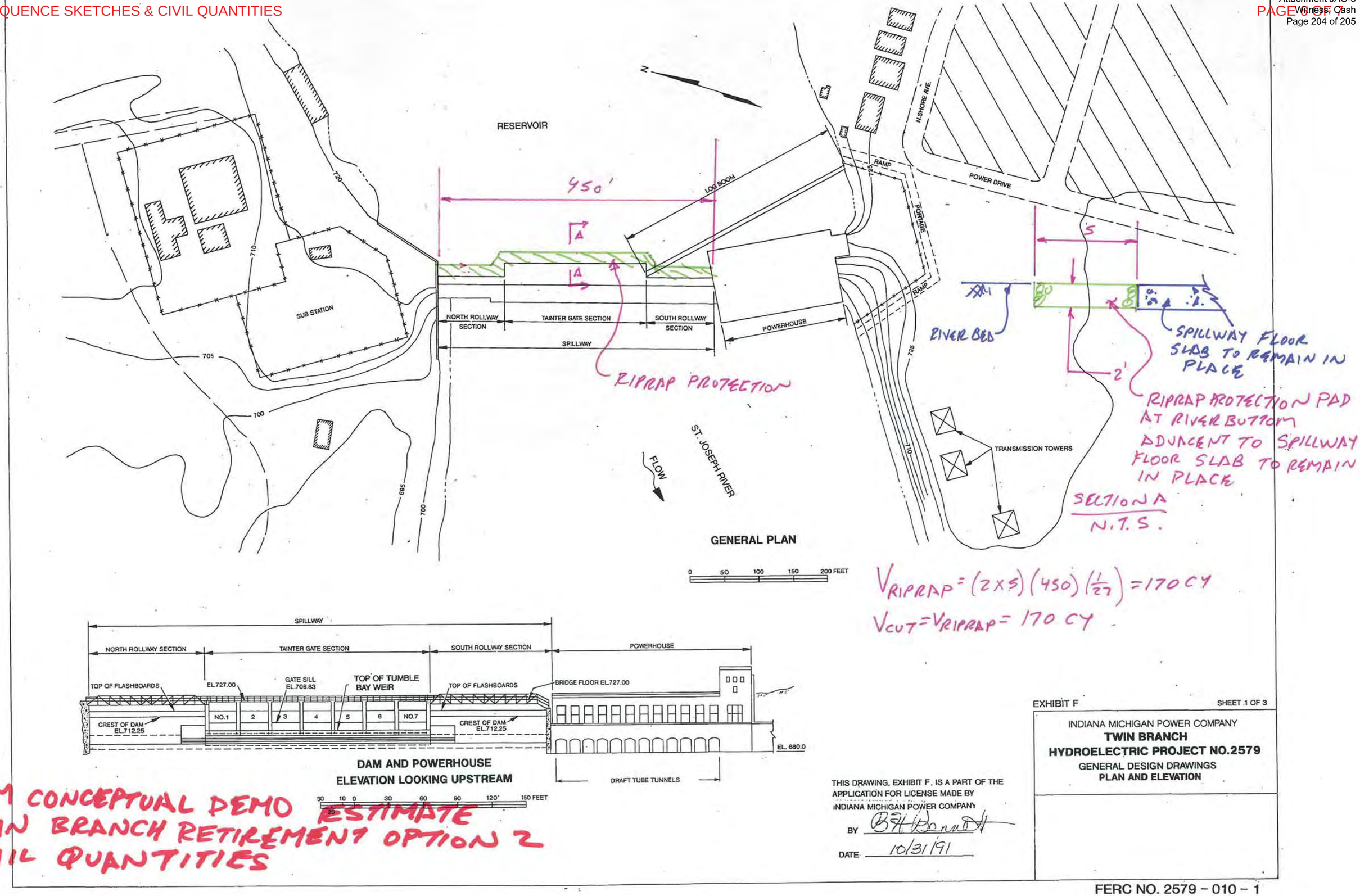
| OPTION 3 | | | |
|---|---|---|---|
| ITEM | QUANTITY | UNIT | REMARKS |
| GRASS SEEDING | 620 | ACRE | |
| RIPRAP PROTECTION AT RIVER BENDS | 54,560 | CY | 2 ft riprap protection @ D(50)=12" |
| ~~RIPRAP PROTECTION AT DAM ABUTMENTS~~ | ~~2,120~~ | ~~CY~~ | ~~2 ft riprap protection @ D(50)=12"~~ |
| ~~EARTHWORK FILL AT DAM ABUTMENTS~~ | ~~15,305~~ | ~~CY~~ | |
| RIVERBED EXCAVATION FOR RIPRAP | 100 | CY | TO BE REPLACED BY RIPRAP |
| RIPRAP PROTECTION AT RETAINING WALLS | 120 | CY | 2 ft riprap protection @ D(50)=12" |


GRASS SEEDING = 286 + 334 = 620 ACRE
RIPRAP = (109,155 + 189,910 + 162,312 + 98,390 + 84,730 + 57,740 + 34,609) 2 x 1/27 = 54,560 CY (ASSUME D50 = 12")
ASSUME 24" RIPRAP DEPTH
A2 = 286 ACRE (GRASS SEEDING)
℄ RIVER (ASSUMED)
162,312 ft²
98,390 ft²
57,740 ft²
34,609 ft³
109,155 ft²
ASSUMED RIVER WIDTH AFTER DAM MODIFICATION/DEMO = 250'
189,910 ft²
84,730 ft²
ASSUMED LIMITS OF BASIN
TWIN BRANCH DAM
A1 = 334 ACRE (GRASS SEEDING)
ASSUMED GRASS SEEDING BETWEEN EXISTING RIVER BANKS AND NEW RIVER BANKS AFTER DAM MODIFICATION (TYP)
ASSUMED RIPRAP PROTECTION AT RIVER BENDS (TYP)
TWIN BRANCH DAM QUANTITIES
JAN 19, 2016
BY: S&L
1000' 0 1000' 2000'
GRAPHIC SCALE

TWIN BRANCH HYDRO RETIREMENT
DEMO SEQUENCE SKETCHES & CIVIL QUANTITIES
BY: S&L



JANUARY 25, 2016
PAGE 1 OF 1




$V_{RIPRAP} = (2 \times 5)(450)\left(\frac{1}{27}\right) = 170\ CY$

$V_{CUT} = V_{RIPRAP} = 170\ CY$

I&M CONCEPTUAL DEMO ESTIMATE
TWIN BRANCH RETIREMENT OPTION 2
CIVIL QUANTITIES

THIS DRAWING, EXHIBIT F, IS A PART OF THE APPLICATION FOR LICENSE MADE BY INDIANA MICHIGAN POWER COMPANY

BY B.A. Hennett

DATE 10/31/91

EXHIBIT F SHEET 1 OF 3

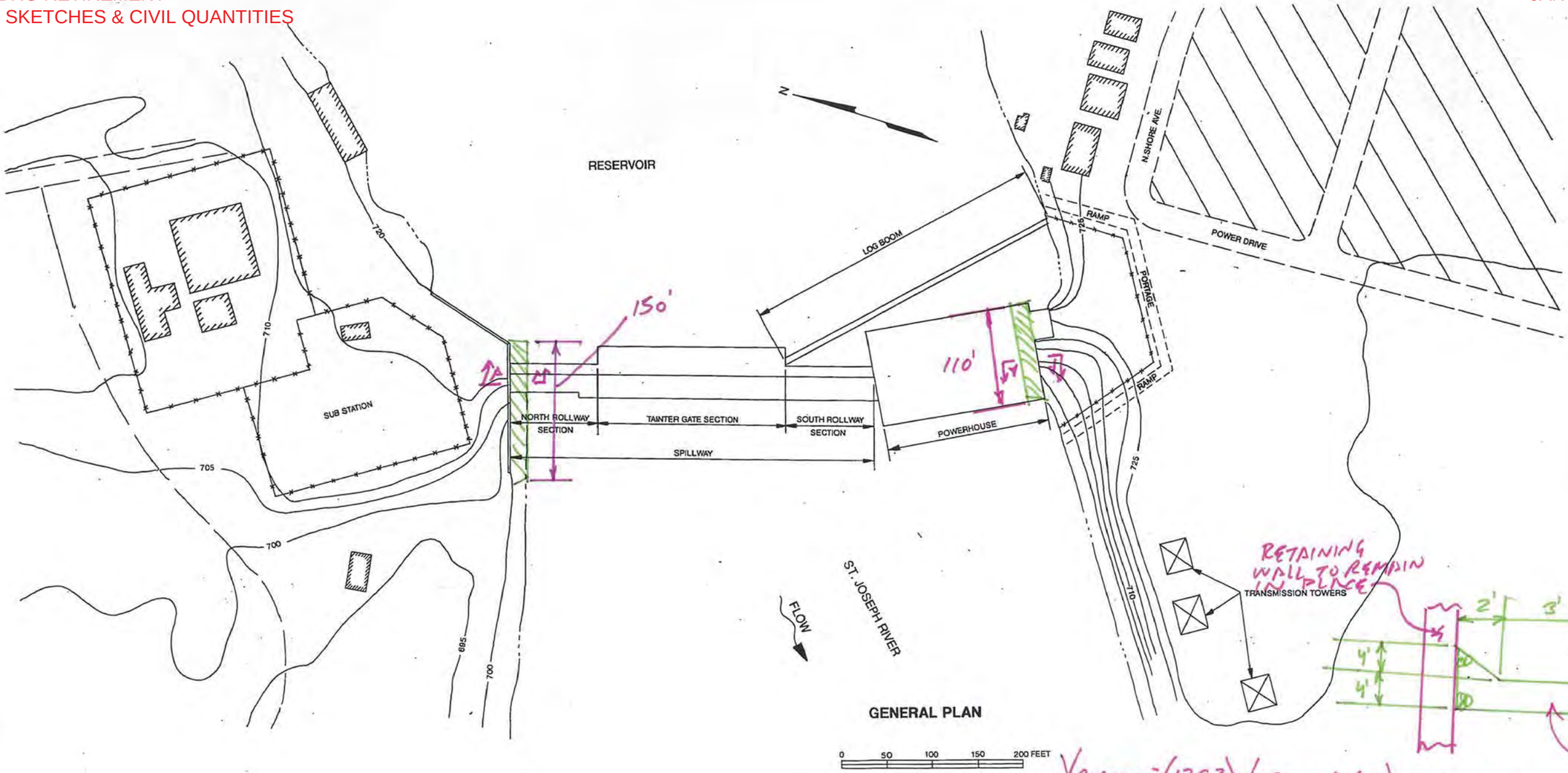
INDIANA MICHIGAN POWER COMPANY
**TWIN BRANCH**
**HYDROELECTRIC PROJECT NO.2579**
GENERAL DESIGN DRAWINGS
**PLAN AND ELEVATION**

FERC NO. 2579 - 010 - 1

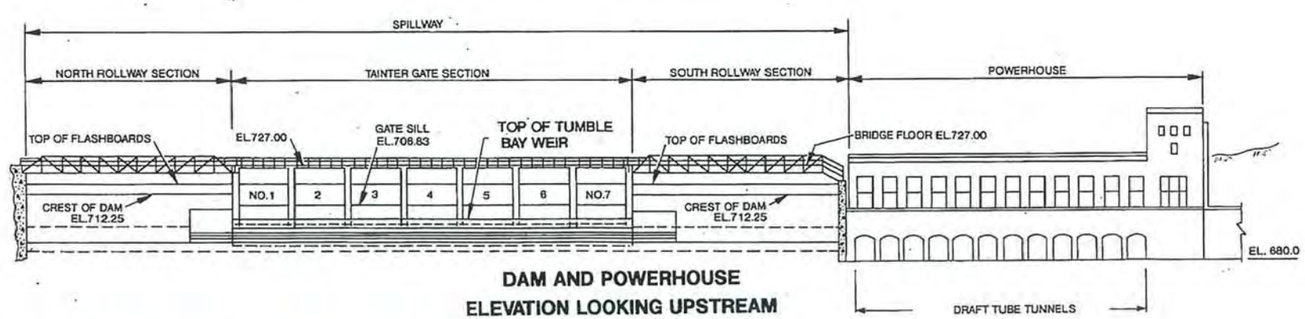
TWIN BRANCH HYDRO RETIREMENT
DEMO SEQUENCE SKETCHES & CIVIL QUANTITIES
BY: S&L








GENERAL PLAN




DAM AND POWERHOUSE
ELEVATION LOOKING UPSTREAM




$V_{RIPRAP} = (12ft^2)(150+110)\left(\frac{1}{27}\right) = 170\ CY$

$V_{CUT} = (2 \times 5)(150+110)\left(\frac{1}{27}\right) \approx 100\ CY$

EXHIBIT F SHEET 1 OF 3

INDIANA MICHIGAN POWER COMPANY
**TWIN BRANCH**
**HYDROELECTRIC PROJECT NO.2579**
GENERAL DESIGN DRAWINGS
**PLAN AND ELEVATION**

THIS DRAWING, EXHIBIT F, IS A PART OF THE APPLICATION FOR LICENSE MADE BY INDIANA MICHIGAN POWER COMPANY

BY _____

DATE 10/31/91

FERC NO. 2579 – 010 – 1

I & M CONCEPTUAL DEMO ESTIMATE
TWIN BRANCH RETIREMENT OPTION 3
CIVIL QUANTITIES