GENERATOR INTERCONNECTION
FEASIBILITY STUDY

for integration of the proposed

in

IDAHO

to the

IDAHO POWER COMPANY ELECTRICAL SYSTEM

For

the

INTERCONNECTION CUSTOMER

FINAL REPORT

1.0 Introduction

Idaho Power Company (IPC) received an interconnection application for small generators,
IPC met on the 6 of October to discuss the project details. The desired project comprised of
which could operate at unity power factor. We reviewed GIS and feeder maps for project location and possible system connections.

On the initial inspection we identified that have feeders in the area for service to the but all feeds to the location were single-phase configurations. The Generation requires a 3-phase connection. The study below describes the cost effective solution for the generation site.

2.0 Summary

Based on the system analysis, utilization of the of generation will require three-phase construction for approximately one mile on the existing feeder. The estimated cost for the project is listed below with the description of configuration studied in the System Impact and Recommended Changes section. These costs do not include the 34.5 kV transformer tie to the feeder.

Estimated Itemized Expenses	Cost
Rebuild 3-Phase from to Generation site. Approximately one mile of rebuild.	$ 90,000
Generation Interconnection Package Design and Installation (Metering, Disconnect Switch, and System Protection Expenses)	$ 125,000
Total Expenses	$ 215,000

3.0 System Description

The Generation will be connected to the 138 kV Sub-transmission system. The provides 34.5 kV service at the Generation location.

4.0 System Impact and Recommended Changes

Idaho Power Company provides generation requirements limiting power output and power factor. IPC requires units run at unity power factor at specified power levels. The system study identified below with associated system modification is based on IPC acceptability criteria per Appendix A.

Case #	Study Configuration	Voltage Flicker	Operational Limits
1	Added feeder with 3-Phase, #4 ASCR rebuild from to Generation site.	Meets Standards	

The Project short circuit contribution does not exceed the short circuit capability of the adjacent feeder protection breaker limits.

5.0 Conclusion

The study above reviewed the requested Generation connection to Idaho Power feeder. The results of the study indicate the existing system requires a 3-phase line construction. The changes to existing feeder require approximately 1 mile of rebuild from the to the Project Generation site. A map with the required feeder changes are displayed in pink in Appendix B.

We look forward to your response for further action on the Generation Project.

APPENDIX A

A-1.0 Method of Study

The study plan inserts the Project up to the maximum requested injection into the selected WECC power flow case and then, using GE's positive sequence load flow (PSLF) analysis tools or Power World Simulator, examines the impacts of the new resource on Idaho Power's transmission system (lines, transformers, etc.) within the study area under various operating/outage scenarios. The WECC and Idaho Power reliability criteria and Idaho Power operating procedures were used to determine the acceptability of the configurations considered. The WECC case is a recent case modified to simulate stressed but reasonable pre-contingency energy transfers utilizing the IPC system. For distribution feeder analysis, Idaho Power utilizes SynerGEE Stoner Software.

A-2.0 Acceptability Criteria

The following acceptability criteria were used in the power flow analysis to determine under which system configuration modifications may be required:

The continuous rating of equipment is assumed to be the normal thermal rating of the equipment. This rating will be as determined by the manufacturer of the equipment or as determined by Idaho Power. Less than or equal to 100% of continuous rating is acceptable.

Transmission voltages, under normal operating conditions, are maintained within plus or minus 5% (0.05 per unit) of nominal. Therefore, voltages greater than or equal to 0.95 pu voltage and less than or equal to 1.05 pu voltage are acceptable.

The stable operation of the transmission system requires an adequate supply of volt-amperes reactive (VARs) to maintain a stable voltage profile under both steady-state and dynamic system conditions. An inadequate supply of VARs will result in voltage decay or even collapse under the worst conditions. Idaho Power designs its system to integrate Network Resources at full capability during specified outage conditions.

Distribution voltage is limited to a 5% voltage flicker on a feeder where other customers are or may be connected.

All customer connections must meet IEEE 519 and ANSI C84.1 Standards.

Equipment/line/path ratings used will be those that are in use at the time of the study or that are represented by IPC upgrade projects that are either currently under construction or whose budgets have been approved for construction in the near future. All other potential future ratings are outside the scope of this study. Future transmission changes may, however, affect current facility ratings used in the study.

A-3.0 Grounding Guidance

Idaho Power Company, IPC, requires interconnect transformers connected grounded-wye on the primary (IPC) side and connected ungrounded wye on the secondary (generator) side.

On wye-wye connected pad-mounted transformers, the manufacturer typically connects the high voltage neutral internally to the low voltage neutral, and the neutral is brought out through the low voltage neutral bushing for grounding (this violates the transformer connections noted above).

If a pad-mounted transformer is utilized, the low voltage neutral shall be disconnected from the high voltage neutral to provide the ungrounded wye secondary connection specified.

A-4.0 Electrical System Protection Guidance

IPC requires electrical system protection per Requirements for Generation Interconnections found on the Idaho Power Web site, http://www.idahopower.com/aboutus/business/generationInterconnect/.

A-5.0 WECC Coordinated Off-Nominal Frequency Load Shedding and Restoration Requirements

IPC requires frequency operational limits to adhere to WECC Under-frequency and Over-frequency Limits per the WECC Coordinated Off-Nominal Frequency Load Shedding and Restoration Requirements available upon request.

APPENDIX B

Feeder Construction Connections to