**Introduction**

Adverse effects of BOS connector degradation include:
- Ohmic loss
- Increased series arc fault risk

This project aims to:
- Develop a model of resistance degradation using accelerated test and field data
- Study the effects of connector resistance on arc fault risks

A subset of the samples included time (hours) and analysis of aged connectors will change. A degradation model is being developed to assess arc fault risk and predict connector lifetime using accelerated tests and field data. Resistance remained below 5 mΩ during time period shown, although variations begin to develop after 4000 hours. Presence of grime has been a non-factor in this data set.

**Methods**

The research approach is outlined in the above figure. Key features include:
- A degradation model based on accelerated test and field data
- Arc fault risk assessment by subjecting new and aged connectors to an arc fault generator

The arc fault generation experiments establish a suitable failure criterion while the degradation model translates the results into BOS connector lifetime.

**Current Results**

A study of unstressed contact resistance variation by brand shows a manufacturer dependence on statistical variations [2].

Silver-plated connector had the tightest distribution.

Current results suggest that system designers should expect contact resistance of 2.3 mΩ with a standard deviation of 0.2 mΩ.

**Conclusions**

A degradation model is being developed to assess arc fault risk and predict connector lifetime using accelerated tests and field data. Current accelerated test results suggest that BOS connectors are robust to the stress factors studied, though degradation and resistance variation in some samples are observed.

Additional accelerated and field tests as well as arc fault experiments are in progress to generate the additional data needed. Analysis of aged connectors is another crucial source of information. If you would like to assist with this effort by supplying connectors of known age and history for analysis, please contact the authors (Benjamin Yang <bbyang@sandia.gov>).

