Date of Submission

March 2015

Network Innovation Allowance Closedown Report

Notes on Completion: Please refer to the appropriate NIA Governance Document to assist in the completion of this form.

Network Licensees must publish the required Project Progress information on the Smarter Networks Portal by 31st July 2014 and each year thereafter. The Network Licensee(s) must publish Project Progress information for each NIA Project that has developed new learning in the preceding relevant year.

Project Closedown

Project Title	Project Reference
Asset Health & Criticality Modeling	NIA_WWU0006

Project Licensee(s)	Project Start Date	Project Duration
National Grid Gas Distribution, Northern Gas Networks, SGN, Wales and West Utilities	Dec 2013	10 Months

Nominated Project Contact(s)

WWU Project Manager – Gareth Robinson (Lead)

Scope

The purpose of the project is to provide a new methodology for delivering the requirements for Ofgem reporting. The collaborative working across the GDNs will provide a consistent benchmark for reporting a complex solution in a pragmatic way. The external service provider will be looking to determine pioneering research into deterioration models and probability of failure analysis using a nationwide data set. This will then be cross referenced with condition analysis based on current data and historical trends.

Objective(s)

The objective of this project is to:

- Develop a consistent reporting framework that is able to score NTS Offtakes, PRSs and District Governors on asset health, criticality, probability of failure and deterioration.
- Provide a system that must be readily accessible and easily incorporated into the asset management working activities of all the GDNs.
- Liaise with all GDNs throughout the process to establish key milestones, interrogate current asset repositories and relevant fault data

Success Criteria

Throughout the project there will be frequent meetings held by the SRWG and with the external candidate to update on project progress and keep within key milestones. Each stage will have its own deliverables and targets which the project will measure against the original scope. The project seeks to deliver:

- Demonstrable models for deriving asset health, criticality, probability of failure and deterioration
- Provide a solution that meets the needs of Ofgem

- Integration of the model into the businesses of each GDN
- Provide final project report

Performance Compared to the Original Project Aims, Objectives and Success Criteria

The service provider has diligently researched each of the GDNs current approach to asset health assessments and has provided a solution which may fit for all the GDNs to use. This method is currently being tested via monthly progress meetings between the service provider and the GDNs and may evolve over the coming months to converge on a satisfactory solution.

The service provider is progressing well against the above success criteria in providing a robust framework for providing a demonstrable model. They have largely completed Stage 1 and have commenced Stage 2 of the project. The future steps will require engineering knowledge inputs and elicitation to validate the model. There are further steps required to ensure that the methodology will satisfy Ofgem but this is a requirement of stage 3 (final stage) of the project.

Required Modifications to the Planned Approach During the Course of the Project

The service provider was originally tasked with providing a criticality methodology in conjunction with the health models. This aspect of the project was removed from the scope by the Safety & Reliability Working Group due to ongoing discussions with Ofgem about how the criticality methodology should work and what the outputs of that work would be. Originally a fairly simplistic and generic criticality methodology was envisaged which would include 4 levels of criticality for all asset groups. During the course of this project Ofgem have indicated an aspiration to provide a methodology with more granular detail than originally tabled by them but also one that would enable risk trading.

It should be noted that in order to deliver asset health methodologies there is further work to be done with all the GDNs and OFGEM due to the iterative nature of this field of asset management. However, the deliverables from this project will be used as the foundations for any future development of asset health methodologies.

Lessons Learnt for Future Projects

The service provider and the GDNs are both entering into new territory with this project in terms of applying deterioration modelling and also applying statistical modelling such as the weibull approach.

These types of techniques have valuable application to current projects and asset groups, and the approach to applying these techniques can be used in future projects. The group have also identified that there will be a clear need in the future for data to be collected in a nationally agreed format. This would enable further iterations of weibull modelling and would also allow greater levels of asset performance comparisons across the UK gas industry.

Note: The following sections are only required for those projects which have been completed since 1st April 2013, or since the previous Project Progress information was reported.

The Outcomes of the Project

The project final report details the current and future asset health modelling approach developed for the Pressure Control assets, namely:

- NTS Offtakes
- PRSs
- Governors

The model has been developed to provide a common reporting methodology for asset health across all UK Gas Distribution Networks. It outputs both a Health Index score and a probability of failure for each asset.

The asset health is calculated using its current parameters (for example age, condition and fault history data). Furthermore, deterioration models have been developed to predict the asset health for subsequent years. These use input data based on the Health Catalogue developed by the GDNs. The Health Catalogue comprises of 8 different health factors, and mapping definitions to enable a common 1 to 5 score for each factor.

The form of the deterioration model for health is based around Weibull modelling for each asset. Weibull modelling is a commonly used approach within reliability engineering and failure analysis and is therefore an appropriate method to use for deterioration of

asset health. Individual Weibull functions have been established per asset type, based on expert opinion of expected lifetimes of assets. Health factors from the catalogue are used to determine the starting point of each individual asset within its deterioration profile, which can then be extrapolated through time to calculate future probability of failures as well as health scores.

Planned Implementation

The models will be used as part of the licence condition requirements for common health reporting. The methodology will form part of the wider requirement to assess all asset groups. The results will be reported to Ofgem as part of the RRP process. Furthermore, the outputs will be used within asset management decision support tools to prioritise asset investment.

Other Comments

A final report has been produced by the service provider documenting all of the principles of the model, this has been published in association with this closedown report. Also, a detailed model guide has been produced.