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Request IR-1:

(a) How old was the transformer that was replaced?

(i) What is the expected useful life of this type of transformer?

Response IR-1:

(a) The failed 67C-T64 transformer that was replaced was installed in 1986 and was 40 years old when it was replaced.

(i) NS Power's asset management plans generally use an expected service life of approximately 50 years for substation transformers. This represents an average planning assumption across the fleet; the actual life of an individual transformer may be shorter or longer depending on factors such as loading, operating conditions, maintenance history, environmental conditions, and asset condition.

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Request IR-2:

(a) What caused the phase-to-phase fault?

(b) Are there any built-in protections to protect from faults such as the one that caused the damage?

(c) Did the transformer have a warranty from the supplier?

(i) If not, why not?

Response IR-2:

(a) The phase-to-phase fault was caused by insulation degradation. The substation transformer experienced a breakdown in its insulation system resulting from the cumulative aging effects over its 40 years of service. As electrical insulation ages, it becomes increasingly susceptible to electrical stress, which can ultimately lead to dielectric breakdown and phase-to-phase faults.

(b) Yes. The transformer was equipped with high-side fuse protection. However, protection systems cannot prevent internal faults from occurring. Internal faults result from insulation breakdown within the equipment and cannot be prevented by external devices. The purpose of substation protection is to reduce the probability of faults, maximize personnel and equipment safety, and minimize damage when faults occur. The transformer's high-side fuse protection operated as intended, isolating the faulted transformer and preventing fault propagation.

(c) No, this unit was no longer under warranty from the supplier.

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- 1 (i) This transformer was installed in 1986 and typical transformer warranty periods
2 last 2-5 years.

REDACTED

Request IR-3:

Does the replacement transformer, now being brought in for the Bridgewater substation, cost the same as the one used to replace this transformer, or have prices changed since this one was ordered for a different job? If the price is different, how much more or less did the replacement one cost?

Response IR-3:

No. The replacement transformer being ordered for the Bridgewater substation costs less than the transformer that was repurposed for use at 67C.

The total invoice for the transformer used for 67C - Whycocomagh was [REDACTED] (all-in cost including equipment, freight, and spare parts, plus [REDACTED] for installation fees).

NS Power received a re-quote of [REDACTED] for the Bridgewater substation transformer replacement (all-in cost including equipment, freight, and spare parts). This represents a reduction of [REDACTED] compared to the 67C - Whycocomagh transformer invoice.

It should be noted that the Bridgewater re-order does not include installation fees. The cost comparison, excluding installation fees, is as follows:

- 67C - Whycocomagh (excluding installation): [REDACTED]
- Bridgewater (excluding installation): [REDACTED]
- Net reduction: [REDACTED]

The price reduction is attributable to improved market conditions and efficiencies gained through reordering. Specifically:

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REDACTED

- 1 • Freight cost reduction: During the first order, shipping costs were volatile. When reordered,
2 the vendor had a much better idea of shipping costs, resulting in a reduction from [REDACTED]
3 (67C - Whycocomagh) to [REDACTED] (Bridgewater), a savings of [REDACTED]
- 4 • Design cost reduction: Since this was a reorder, design costs were minimal, thus reducing
5 the price of the transformer itself.

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1 **Request IR-4:**

2
3 **(a) What, if any, protections are being put in place to ensure a similar fault does not**
4 **happen to the new transformer?**

5
6 **(i) Why were these protections not implemented for the old transformer?**

7
8 **Response IR-4:**

9
10 Please refer to IR-2 (b).