

Electrical Safety and Technical Regulation

Validation Report for the United Energy 2016-2017 Fire Start Report



Document information

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Introduction

Background

The Victorian Governor in Council made the Order in Council for the F-Factor Scheme Order 2016 under section 16C of the *National Electricity (Victoria) Act 2005*. This was gazetted on 22 December 2016.

The f-factor scheme is managed by the Australian Energy Regulator (AER). Section 7 of the Order in Council identifies that the AER may request Energy Safe Victoria (ESV) to validate the fire start reports submitted to the AER by the Distribution Network Service Providers. Each fire start report will have an individual validation report.

The Order in Council stipulates that each Distribution Network Service Provider (DNSP) will provide a fire start report to the AER by 30 September each year. The Order in Council also stipulates that, if requested by the AER, ESV will provide a validation report to the AER by 30 November each year.

The Order in Council also identifies that the AER may refer any submissions regarding the validation reports to ESV in order to provide a revised validation that responds to the submissions by 15 February in the following year.

Request from AER

The AER wrote to Paul Fearon, Director of Energy Safety, on 3 October 2017 to formally request that ESV validate the 2016-2017 fire reports provided by the DNSPs (AER ref. 62035). The AER also provided the following documents for the validation assessment:

- | | |
|---|-------------------|
| ▶ United Energy 2017 F-factor RIN Statutory declaration | PDF document |
| ▶ UED F Factor audit opinion – 2017 | PDF document |
| ▶ United Energy F-Factor Scheme Report 2016-17 | Excel spreadsheet |

These documents consider the United Energy distribution system separately from other systems managed by the service provider.

The AER advised ESV that, where necessary for the purposes of validation, ESV should seek additional information directly from the DNSPs. This is in line with clause 7(4) of the Order in Council. Where additional information was sought, ESV ensured that the AER was copied into any correspondence.

Validation process

While the scope of the fire start report and the validation process are detailed in the Order in Council (as outlined below), the approach to be undertaken in assessing the accuracy of information provided is not specified. This section describes the process that ESV applied to the validation assessment; the results are provided later in this report.

Scope

In reviewing the information provided in a DNSP's fire start report, clause 7(3) of the Order in Council stipulates that ESV's validation report:

- (b) must include an assessment of the accuracy of the information provided in the fire start report pursuant to clauses 6(3)(d)-(f) and (h), specifically:
- (c) must verify the estimate of the ignition risk unit (IRU) amount for the financial year provided under clause 6(3)(g).

These specific items are detailed in clause 6(3) of the Order in Council, which states that a DNSP's fire start report must, among other things:

- (d) if the Distribution Network Service Provider is the service provider in relation to more than one distribution system, distinguish between distribution systems;
- (e) list all fire starts for a financial year, stating in each case and where known:
 - (i) what kind of fire start it was;
 - (ii) the date, time and latitude and longitude for each fire;
 - (iii) the unique identification number of the pole and polyphase electric line nearest to the fire start;
 - (iv) the voltage of the electric line in which the ignition occurred;
 - (v) the estimated value of the fire start expressed in IRUs, calculated in accordance with this Order;
- (f) state whether the fire was reported to a relevant entity;
- (g) calculate the total IRU amount for the financial year on the basis of the information contained in the fire start report, in accordance with this Order;
- (h) include such other information as the AER may from time to time specify;

Clause 6(3) of the Order in Council also requires that the DNSP's fire start report:

- (i) include an independent audit of the fire start report undertaken by an external auditor;
 - (i) stating, in the auditor's opinion, whether the information contained in the fire start report is accurate and reliable; and
 - (ii) which is acceptable to the AER.

Methodology applied

For its validation assessment, ESV broke these items into the two categories:

▶ IRU-specific factors

These comprise those factors within the fire start report that are directly relevant to the calculation of the IRUs for the incident. Specifically these are the date, time and latitude and longitude for the fire and the distribution business' estimate of the IRUs for the fire [items (e)(ii) and (e)(v) in the Order in Council].

▶ Non-IRU factors

These comprise all other information reported in the fire start report [items (e)(i), (e)(iii) and (e)(iv)].

A more detailed analysis was undertaken of the IRU-specific factors than of the non-IRU factors.

ESV validated the DNSP fire start reports as follows:

▶ *Preliminary review*

The purpose of the preliminary review was to determine that the information provided to ESV was complete and in a satisfactory form for ESV to undertake its validation analysis.

ESV started by reviewing the documentation provided by the AER to ensure that all relevant information was provided and readable.

The DNSP's fire start spreadsheet was then subject to a preliminary, high-level review to ascertain whether there were any obvious issues with the information contained therein. If the preliminary review identified any issues, ESV would contact the DNSP so that the DNSP could provide an updated spreadsheet.

▶ *Completeness assessment*

The purpose of the completeness assessment was to determine whether:

- all fires in the DNSP's fire start report are listed as fires in OSIRIS¹
- all network-related fires listed in OSIRIS are included in the DNSP's fire start report.

Where there were differences identified, ESV contacted the DNSP to confirm the reasons for the difference.

The DNSP then provided a rationale for the differences and, where there was a change to the information in the fire start spreadsheet, the DNSP provided an updated spreadsheet reflecting any changes and, in some instances, additional supporting information.

We reviewed the rationale and information subsequently provided by the DNSP to confirm we were satisfied with the reasons for the inclusion or exclusion of specific incidents.

▶ *Comparative analysis — IRU-specific factors*

The purpose of the comparative analysis of IRU-specific factors was to identify any *material* differences between the information reported by the DNSP in its fire start report and through OSIRIS. In determining materiality, ESV considered whether:

- any differences in the location were sufficient to result in a lower location multiplier being applied to the fire start
- any differences in the location were sufficient to result in an incorrect CFA region being used for determining the applicable Fire Danger Rating for the fire start
- any differences in the date and time were sufficient to result in an incorrect Fire Danger Rating being applied to the fire start.

Where potentially material differences were identified, ESV contacted the DNSP to confirm the reasons for the differences.

The DNSP then provided a rationale for the differences and, where there was a change to the information in the fire start spreadsheet, the DNSP provided an updated spreadsheet reflecting any changes and, in some instances, additional supporting information.

We reviewed the rationale and information subsequently provided by the DNSP to confirm we were satisfied with the rationale and information provided.

¹ OSIRIS is ESV's incident reporting portal for the major electricity companies to report details of any serious electrical incidents to ESV. These incidents include a range of events that include fires involving network assets.

▶ *Comparative analysis — non-IRU factors*

The purpose of the comparative analysis of non-IRU factors was to identify any differences between the information reported by the DNSP in its fire start report and through OSIRIS.

Where differences were identified, ESV has identified these in this report. No further consultation with the DNSP was undertaken.

Following the validation process, ESV then used the final data to calculate an IRU amount for each fire start. We then compared these against the IRU amounts provided by the DNSP, and a total IRU amount was calculated.

Caveats

The following caveats apply to the validation process and the contents and findings of this report:

▶ *Accuracy of the fire start data*

The validation process involves the comparison of two data sets — the DNSP's fire start report and incident data reported by the DNSP via ESV's OSIRIS. Where there are discrepancies between the data reported in these two data sets, ESV has not sought to ascertain which data set provide the true and accurate record of each fire start for the purposes of this report; however, we will pursue this in subsequent discussions with the DNSP.

As such, ESV can only attest that the data provided in the fire start report is appropriate for the purposes of calculating the total IRU amount. The information provided in the DNSP's fire start report should not be used for other purposes without further analysis of the data to verify it is fit for such purposes.

▶ *Validation against third-party sources*

ESV has not sought to validate or verify the data in the DNSP's fire start report in its entirety against third-party sources such as the Country Fire Authority (CFA) and Melbourne Metropolitan Fire Brigade (MFB).

This is not deemed to be a significant limitation on the validation process as any fires involving network assets should be reported by the CFA/MFB to the DNSP and these are, in turn, reportable to ESV.

Individual records may have been subject to confirmation with the CFA and/or MFB on a case-by-case basis. If this has occurred, it is noted within the report.

▶ *Independent verification of fire starts*

ESV does not have the resources available to routinely undertake independent assessments of the DNSP's electricity network in order to ascertain whether the DNSP identifies all incidents, including fires. As such, the fire starts may be under-reported; however, we are confident that the number of such incidents is small and that no significant fires could have gone unreported.

Similarly ESV has not undertaken an independent audit of the DNSP's records to ensure their accuracy. In this regard, we have relied on this being undertaken as part of the independent audit commissioned by the DNSP, the details of which were submitted as part of the fire start report.

Accuracy of information provided

ESV undertook an assessment of the accuracy of the information provided in the United Energy fire start report in accordance with clause 7(3)(b) of the Order in Council. The following sections outline the findings of the assessment.

Further details regarding the specific incidents reported in the fire start report are available upon request.

Preliminary review

Upon receipt of United Energy's documentation, we undertook a preliminary review to ensure that all the required documents had been provided to ESV and that the fire reporting spreadsheet had no obvious issues with regard to incomplete or incorrect data.

The review identified that there were eleven rows in the fire reporting spreadsheet where the row height had been reduced almost to zero. These rows included data; however, it was not clear whether this data was to be included in the validation analysis.

ESV wrote to United Energy seeking clarification on 2 October 2017. United Energy replied to ESV on 4 October 2017 confirming the rows were to be included in the assessment, and noting that there was an error in the fire reporting spreadsheet. United Energy provided an amended spreadsheet for ESV's and the AER's records (United Energy F-Factor Scheme Report 2016-17 v2.0).

Completeness assessment

We compared the records provided in the United Energy fire start spreadsheet with those available from ESV's OSIRIS incident reporting portal. This comparison was undertaken to assess the completeness of the fire start report, with specific attention paid to identifying any records missing from either data set or classified differently between data sets.

The analysis identified seven incidents where there were discrepancies between the United Energy fire start report and ESV's OSIRIS records. Details are provided in Table 1.

ESV wrote to United Energy on 31 October seeking clarification of the incidents identified in Table 1.

On 4 November, United Energy provided a detailed response for each incident and an updated fire start spreadsheet.

The updated fire start spreadsheet was used for the subsequent analyses detailed herein.

Comparative analysis — IRU-specific factors

We compared the location (latitude and longitude) and timing (date and time) of each record in the fire start report with the record of the same incident in OSIRIS.

As we recognised that errors may be introduced into the location data due to rounding errors and other system-induced errors, we rounded all latitudes and longitudes to five decimal places to reduce the impact of such errors on the analysis.

The subsequent comparison of the records found extensive discrepancies in both the location and timing data — 100% of incident locations and 60% of incident times differed between the data sets. Further statistics on these discrepancies are provided in Table 2.

ESV will be following up with United Energy regarding these discrepancies as a separate matter after completion of the f-factor reporting process.

Table 1 Discrepancies between fire start report and OSIRIS

OSIRIS report no.	Included in fire start report	Listed as fire in OSIRIS	Comment
20170109UTD_05 20170405UTD_01	✓	✗	Incidents not listed in OSIRIS as fires. OSIRIS reports re-opened for United Energy to update. No impacts on f-factor validation process.
20160914UTD_01 20170224UTD_07 20170425UTD_05	✗	✓	Incidents listed in OSIRIS as fires, but not included in fire start report. Review of these incidents by United Energy identified that: <ul style="list-style-type: none"> ▫ incidents 20160914UTD_01 and 20170425UTD_05 should have been included in the fire start report ▫ incident 20170224UTD_07 was incorrectly listed as a fire in OSIRIS and should not be included in the fire start report. Incident 20170224UTD_07 was re-opened for United Energy to update. No impacts on f-factor validation process.

Table 2 Discrepancies in location and timing data

Statistic	Location data	Timing data
Number of records	78	78
Number of discrepancies	78 (100%)	47 (60%)
Minimum discrepancy	5.5 m	1.0 min
Maximum discrepancy	1,076.4 m	1,440 min (24 hrs)
Average discrepancy	52.8 m	105.4 min
Median discrepancy	21.5 m	8.0 min

While there was a high level of difference between the data sets, ESV focused its analysis on those records where the differences could materially affect the IRU calculated for the fire start.

ESV applied the following tests to determine if the differences between the data sets could be material:

- ▶ **Test 1** : Is the difference in coordinates sufficient that a change in location may result in a higher location multiplier being applied?

This was assessed by calculating the distance between each location in the fire start report and the nearest boundary to a region where a larger location multiplier² would apply (the buffer distance). If the difference in coordinates multiplied by 1.1 was greater than the buffer distance, the record was flagged for further discussion with the DNSP.³

Thus, the materiality in Test 1 is not solely a function of the size of the difference in coordinates, but is more directly influenced by where the incident occurs (together with the size of the difference). Those events closer to boundaries are more likely to be flagged for further assessment; those events with large differences, but far from a boundary, are less likely to be flagged.⁴

- ▶ **Test 2** : Does the Fire Danger Rating applicable at the location and time for a record differ when based on the information specified in the fire start report and in OSIRIS?

ESV determined the applicable CFA region for each record by using the EM-COP website to check the CFA region at the OSIRIS coordinates.⁵ We then ascertained the Fire Danger Rating based on that CFA region and the date and time data from OSIRIS. These were then compared against the Fire Danger Ratings specified in the DNSP's fire start spreadsheet and differences identified for further investigation.

Thus, the materiality in Test 2 could either be due to a difference in the location or time data.

ESV identified that the cause of some differences may be due to the DNSPs assuming that a Fire Danger Rating does not apply at the location because the CFA has not yet declared the fire danger period for the municipality in which the fire occurred. Given the Fire Danger Rating is forecast by the Bureau of Meteorology for large regions covering multiple municipalities, it is possible that a Fire Danger Rating has been forecast for the region before the fire danger period is declared for the municipality. ESV has reviewed the Order in Council and concluded that it is irrelevant to the calculation of the IRU amount whether or not the CFA has declared the fire danger period for municipality. It only matters that a Fire Danger Rating has been forecast for the region.

Using these two tests, we identified those records where the differences in information have the potential to materially affect the IRU for the fire start (Table 3). ESV wrote to United Energy on 23 November seeking clarification of these items.

On 28 November, United Energy wrote to ESV confirming that the location information provided in its fire start report was the most recent and correct data following an internal incident investigation. United Energy also provided further confirmatory information, including pole asset numbers and details of the locations from its Geographic Information System and further analysis. ESV reviewed this information and concluded that no updates to the fire start report were required.

² These regions are specified in clause 11(b) of the Order in Council.

³ Given that distance between points on the globe is dependent on the latitude and longitude of the points, we calculate the approximate difference in meters using latitude and longitude conversion factors based on a central location. We then included a further 10 per cent margin to allow for approximations in the calculation.

ESV believes that the use of an approximation is acceptable for the general purpose of identifying records for further analysis.

⁴ As noted earlier, ESV will follow up with United Energy as a separate process.

⁵ Emergency Management Common Operating Picture (<https://cop.em.vic.gov.au>).

Table 3 Discrepancies potentially material to calculation of the IRU amount

Incident number	DNSP fire start report			OSIRIS data		
	latitude	longitude	date/time	latitude	longitude	date/time
20160927UTD_01	-38.37384	145.12121	25/09/2016 19:53	-38.37367	145.12145	25/09/2016 19:45
20161026UTD_02	-37.94861	145.04224	2/10/2016 12:06	-37.94864	145.04165	2/10/2016 11:30
20161109UTD_03	-37.93471	145.0496	6/11/2016 2:58	-37.93433	145.0497	6/11/2016 2:58
20170309UTD_01	-38.42237	144.88689	5/03/2017 15:12	-38.42151	144.88745	5/03/2017 15:00
20170615UTD_02	-38.01247	145.15722	13/06/2017 18:36	-38.01237	145.15724	13/06/2017 17:30

Comparative analysis — non-IRU factors

ESV undertook a comparison of the data in the United Energy fire start report and OSIRIS related to:

- ▶ the kind of fire start
- ▶ the pole and polyphase electric line identifications numbers
- ▶ the voltage of the electric line.

Details from OSIRIS on the asset involved and the incident description were used to determine whether the kind of fire start had been correctly identified. This involved a subjective assessment of the information.

A direct comparison was made of the details of the pole and line identification numbers and line voltage in the fire start report and OSIRIS. This did not require any subjective assessment.

The assessment of ESV fire start category found no discrepancies with the categories reported in the United Energy fire start report. We then used the ESV fire start category data to determine the broader fire start type as defined in Clause 5 of the Order In Council. No discrepancies were found in the fire start types assigned by United Energy.

ESV found discrepancies in the pole identification for eleven of the 78 fire starts. Of these, two records appeared to have typographic errors in one of the data sets (incidents 20161104UTD_02 and 20170615UTD_02), two had different pole identification numbers (incidents 20170206UTD_01 and 20170214UTD_03) and seven were where no pole identification number was provided in OSIRIS.⁶

Discrepancies were found in the polyphase electric line identification for 37 of the 78 fire starts. Of these, one record appeared to have a typographic error in one of the data sets (incidents 20170405UTD_01), four records had different line identification numbers (incidents 20161116UTD_01, 20161109UTD_03, 20170209UTD_02 and 20170330UTD_03) and 32 were where no line identification number was provided in OSIRIS.⁶

There were differences in the line voltages records for six of the 78 fire starts. Four were reported at a lower voltage in the fire report than in OSIRIS; two were reported at higher voltages in the fire start report.

These discrepancies had no material impact on the total IRU calculation.

No consultation was held with United Energy regarding these discrepancies.

⁶ Pole and line identification numbers are currently non-mandatory fields in OSIRIS.

Verification of IRU amount

Following the validation of individual records, ESV compiled any changes to the fire start records and assigned the corresponding location and danger multipliers. In assigning multipliers, ESV corrected the danger multiplier formula in the AER template spreadsheet to ignore whether the CFA had declared the fire danger period for the municipality. The individual and total IRU amounts were then calculated.

We then compared our location and danger multipliers with those of United Energy to determine whether United Energy had correctly assigned the multipliers for each fire start. While there were no changes due to the incidents identified in Table 3, we identified 21 incidents where there were differences in the multipliers and IRU amounts calculated by United Energy and ESV. Table 4 shows these differences.

United Energy has used the AER template spreadsheet and its formulae to calculate the multipliers and IRU amounts. The differences in all 21 instances are due to the spreadsheet assuming the lowest danger multiplier applies in areas where the CFA has not yet declared the fire danger period for the municipality, despite the Bureau of Meteorology forecasting a Fire Danger Rating for the region.⁷

ESV has reviewed the Order In Council and concluded that it is irrelevant to the calculation of the IRU amount whether or not the CFA has declared the fire danger period for municipality. It only matters that a Fire Danger Rating has been forecast for the region. We have used an amended formula to calculate the danger multiplier for each incident and the subsequent IRU amounts and total IRU amount.

As a result of these changes, ESV can confirm that the total IRU amount provided in the United Energy 2016-2017 fire start report⁸ needs to be amended from 5.88 to 7.34.

⁷ This may occur because, while the CFA declares the fire danger period at a municipal level, the Fire Danger Rating is forecast by the Bureau of Meteorology for large regions covering multiple municipalities. It is possible that a Fire Danger Rating can be forecast at the regional level before the fire danger period is declared for the municipality.

⁸ As per Final F-Factor Scheme Report 2016-17 Revised Nov 2017.xlsm

Table 4 Amendments to multipliers and IRU amounts

cells in orange show where differences were found

Fire start number	Incident number	DNSP fire start report			ESV analysis		
		danger multiplier	location multiplier	IRU amount	danger multiplier	location multiplier	IRU amount
24	20161104UTD_02	0.1	1	0.1	0.2	1	0.2
25	20161108UTD_02	0.1	0.2	0.02	0.5	0.2	0.1
26	20161109UTD_03	0.1	0.2	0.02	0.2	0.2	0.04
27	20161111UTD_01	0.1	0.2	0.02	0.2	0.2	0.04
28	20161114UTD_02	0.1	0.2	0.02	0.5	0.2	0.1
29	20161116UTD_02	0.1	0.2	0.02	0.5	0.2	0.1
30	20161121UTD_01	0.1	0.2	0.02	0.5	0.2	0.1
31	20161124UTD_01	0.1	0.2	0.02	0.2	0.2	0.04
32	20161201UTD_01	0.1	0.2	0.02	0.2	0.2	0.04
33	20161214UTD_02	0.1	0.2	0.02	0.2	0.2	0.04
34	20161221UTD_01	0.1	1	0.1	0.2	1	0.2
35	20161220UTD_01	0.1	0.2	0.02	0.5	0.2	0.1
36	20161220UTD_02	0.1	0.2	0.02	0.2	0.2	0.04
37	20170117UTD_04	0.1	0.2	0.02	0.5	0.2	0.1
38	20161222UTD_02	0.1	0.2	0.02	0.2	0.2	0.04
69	20170330UTD_03	0.1	1	0.1	0.5	1	0.5
70	20170403UTD_01	0.1	0.2	0.02	0.5	0.2	0.1
71	20170405UTD_01	0.1	1	0.1	0.2	1	0.2
72	20170425UTD_04	0.1	0.2	0.02	0.2	0.2	0.04
73	20170425UTD_05	0.1	0.2	0.02	0.2	0.2	0.04
74	20170430UTD_04	0.1	0.2	0.02	0.2	0.2	0.04

Conclusion

As noted earlier, the Order In Council stipulates that this validation report:

- (b) must include an assessment of the accuracy of the information provided in the fire start report pursuant to clauses 6(3)(d)-(f) and (h), specifically:
- (c) must verify the estimate of the ignition risk unit (IRU) amount for the financial year provided under clause 6(3)(g).

Table 3 identifies where these items have been assessed within this report and summarises the key findings of the validation assessment.

Table 3 Summary of findings

Statistic	Relevant report section	Key findings
Clause 6(3)(d)	Request from AER	The fire start report addressed the United Energy distribution system separately from other systems managed by the service provider.
Clause 6(3)(e)(i)	Comparative analysis — non-IRU factors	There were no discrepancies between the assessment of the ESV fire category and fire type made by United Energy and that made by ESV.
Clause 6(3)(e)(ii)	Comparative analysis — IRU-specific factors	While there were a significant number of differences between the fire start report and OSIRIS data sets, only 21 of these discrepancies were material to calculation of the total IRU amount.
Clause 6(3)(e)(iii)	Comparative analysis — non-IRU factors	There were eleven discrepancies between the fire start report and OSIRIS in relation to pole identification number. There were 37 discrepancies between the fire start report and OSIRIS in relation to polyphase electric line identification number. These discrepancies were not material to the calculation of the total IRU amount.
Clause 6(3)(e)(iv)	Comparative analysis — non-IRU factors	There were six discrepancies between the fire start report and OSIRIS in relation to voltage of the line involved in the fire. These discrepancies were not material to the calculation of the total IRU amount.
Clause 6(3)(e)(v)	Verification of IRU amount	The total IRU amount provided in the United Energy 2016-2017 fire start report needs to be amended from 5.88 to 7.34.
Clause 6(3)(f)	Completeness assessment	United Energy had reported all fires to ESV as the relevant entity.