Stephen Eliot	RCP Support (Chair)	Sde ¢

Chris Binstead	Synergy	
Martin Maticka	Australian Energy Market Operator (**AEMO**)	
Wendy Ng	ERM Power	
Matthew Bowen	Jackson McDonald	
Penny Ling	Metro Power	
Hugh Webster	Infrastructure Capital	
Kei Sukmadjaja	Western Power	
Peter Huxtable	Water Corporation	
Tom Frood	Bright Energy Investments	
Bobby Ditric	The Lantau Group	
Geoff Gaston	Change Energy	
Dora Guzeleva	Energy Policy WA (**EPWA**)	
Sandy Ng	AEMO	
Oscar Carlberg	Alinta Energy (**Alinta**)	
Daniel Ravikovitch	Jackson McDonald	
Jo-Anne Chan	Synergy	

Date: 10 May 2021 Time: Attendees Representing Comment

Grace Liu	AEMO	
Rhiannon Bedola	Synergy	
Jacinda Papps	Alinta	
Sam Lei	Alinta	
Timothy Edwards	Metro Power	
Erin Stone	Point Global	
Edwin Ong	AEMO	
Naomi Donohue	APA Group	
Laura Koziol	RCP Support	
Jenny Laidlaw	RCP Support	
Adnan Hayat	RCP Support	
Vijeshni Ashna Nand	RCP Support	
Natalie Robins	RCP Support	

Item	Subject	Action

1 Welcome

The Chair opened the meeting at 9:30 AM and welcomed members and observers to the workshop. The Chair noted that the Rule Change Panel (**Panel**) was holding two workshops:

One workshop on 10 May 2021 to discuss the Draft Rule Change Report for RC_2019_03, to give:

- the Panel an early indication of Market Participants' concerns so that the Panel can get started on analysis of these issues; and
- Market Participants an opportunity to discuss the Draft Rule Change Report to help them prepare their formal submissions.

A second workshop on 11 May 2021 to review the drafting of the Amending Rules.

2 Discussion of the Draft Rule Change Report

The Chair indicated that there would be three presentations in the workshop – from RCP Support, Alinta and the ERA; and that there would then be time for questions and discussion after the presentations.

RCP Supportôs Presentation[1]

RCP Support slides 1-4:

Ms Laura Koziol indicated that RCP Support's presentation would cover:

[1] RCP Support's presentation is available at

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- calculation of the fleet's effective load carrying capability (**ELCC**);
- volatility of the ELCC;
- the target loss of load expectation (**LOLE**);
- the determination of the Relevant Levels for individual facilities;
- the treatment of small facilities;
- the Reserve Capacity Mechanism (**RCM**) timeline; and
- next steps for processing RC_2019_03.

Ms Koziol indicated that RCP Support's presentation would not cover:

- the Reference Period under the draft decision;
- the distributed energy resources (**DER**) adjustment to historical load;
- the Capacity Outage Probability Table (**COPT**);
- treatment of proposed facilities; or
- treatment of Early Certified Reserve Capacity (**CRC**) and Conditional CRCb ₴ ő ᴰ˳ ᵐ Ṃ˳ ᴰ ᴰ ʊ ᵐ ɒ ى ɒ γ ᵐ MM→ovld ni] v

Fleet ELCC. This shows that the few TIs with the highest system demand are the driver for the ELCC for the whole period.

RCP Support slides 8 and 9:

Ms Koziol used these slides to show how the ELCC calculation works.

RCP Support slide 10:

Ms Koziol indicated that the draft decision was to use the ELCC method to set the capacity value of the fleet of candidate facilities. The ELCC method finds the TIs with the highest system stress and accounts for the right factors:

- the steep load duration curve in the WEM;
- the unpredictability of the number of higher system stress TIs; and
- that most TIs during the Reference Period do not have a material effect on the ELCC.

RCP Support slide 11:

Ms Koziol noted that the South West Interconnected System (**SWIS**) has peaky system demand and that high system stress events are rare, which can lead to high volatility of the Fleet ELCC and of individual facility allocations.

Ms Koziol noted that there is no guarantee that the historical performance of the fleet in the TIs that set the ELCC will be similar to its performance in future high system stress events.

Ms Koziol indicated that one way to address this issue would be to model the output of candidate facilities during alternative scenarios of high system stress. Ms Jenny Laidlaw indicated that AEMO had suggested that this might be possible in future, and Ms Koziol indicated that the Relevant Level Method (**RLM**) could be adjusted to do this in the future, but that the changes could not be implemented in time for the 2021 Reserve Capacity Cycle (**RCC**).

Ms Koziol indicated that another alternative would be to base the value of the fleet and the individual allocations on a larger set of actual values, taking into account performance during intervals that

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	non-intermittent facilities' CRCs equals the Reserve Capacity Requirement, and then use the resulting LOLE as the target LOLE.	

- As an example, Ms Laidlaw pointed out that Collgar and Warradarge have similar First-In ELCCs, that the facilities have similar sizes, and that their average output is not substantially different; but there is quite a difference between their Last-In ELCCs. This was because there are many other generators in the general vicinity of Warradarge with similar output to Warradarge.

Dr Shahnazari commented that:

- The ERA's proposed allocation method accounts for the physical factors, including locational differences. These factors influence the average output of facilities during stress periods. The ERA's allocation method uses a sampling method to calculate average output of facilities during stress periods having consideration for representativeness of the sample and variation of results.
- The calculation of technology groups' ELCCs is important to ensure that the allocation of diversity benefits considers the contribution of resources to:

  shifting the periods of high-reliability stress from peak demand to peak load for scheduled generation (**LSG**); and

  the contribution of resources to mitigating the probability of loss during peak LSG periods.

Mr Oscar Carlberg agreed with Dr Shahnazari's points. su d ¶

The Chair noted that this issue was probably going to be the biggest point of discussion and that the presentation was over time, and suggested that the m ɔ l D ʊ A ds l M ɔ D A ba Qrthat mM m ж m ʊ ȳ] T M ƙ l γ ȝ M

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	The Chair asked stakeholders to comment in their submissions on whether AEMO should be allowed to include Semi-Scheduled Facilities in one of the groups of small facilities.	

each get a 52% increase and Collgar gets a 17% increase), while others get large decreases (like Mumbida and Walkaway).

Alinta slide 7-9:

Mr Nunn showed a chart with the average output profile for Walkaway, Albany and Grasmere over the course of a day and indicated that Walkway has a large dip in average output in the middle of the day, but higher average output during peak times.

Mr Nunn compared the Capacity Credit allocations for Walkaway at about 10-12% of nameplate capacity versus Albany and Grasmere at upwards of 75-80%.

Mr Nunn observed that the Delta Method has enormous consequences:

- the 80% capacity factors for Albany and Grasmere seemed implausible, as they suggested that the facilities are almost firm resources;
- Grasmere was receiving about the same number of Capacity Credits as Walkaway even though it was about one-te Î t ‡ ‘

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the ERA's method – it does not select just the highest TIs, it selects TIs that are spread out across several days.

- In response to a question from Ms Laidlaw, Mr Nunn indicated that he was referring to using a small number of TIs to determine the Fleet ELCC but more intervals to allocate the Fleet ELCC.

Alinta slides 14-19:

Mr Nunn presented a chart that shows the average capacity factor of Grasmere and Walkaway over the top 1,000 TIs. Mr Nunn suggested that this indicates that Grasmere performs well over the top 1,000 TIs compared to Walkaway, particularly in the top 50 TIs, which is what is driving the results – Grasmere was producing and Walkaway was not.

Mr Nunn showed a second chart that showed that Collgar and Albany also perform well in top 50 periods.

Mr Nunn indicated that the changing profile of the capacity factors of the facilities in the top 12-20 TIs is what drives their CRC.

Mr Nunn pointed out that the top 12 TIs have occurred over the course of three days – 8 February 2016, 14 March 2016 and 4 February 2020. Mr Nunn pointed out that what is driving the results is that in these days:

- Grasmere and Albany performed very well in all three days;
- Collgar did not perform well on one day, performed very well on another day, and averagely on the third day; and
- Walkaway performed poorly on two out of the three days, and about average on the other day.

Alinta slides 20-21:

Mr Nunn indicated that the outcomes on these three days are highly correlated with one another. What is concerning is that the Delta Method is really looking at three observations of wind farm output, and that this is too small a sample that is not going to be robust.

Mr Nunn indicated that Alinta is also concerned that the results could be prone to drastic changes. A single high demand day or heatwave could lead to drastic revisions to the capacity values of facilities, and could occur in any year with entirely different outcomes for all wind farms. It was possible that there could be a heatwave next year, all of the wind farms could fail simultaneously, and get zero capacity value as a result.

Mr Nunn expressed concern that the Delta Method seems to be driven by so few observations that it is not fit for purpose.

Ms Koziol agreed with Mr Nunn thatems to be ef then

ELCC method arriving at a lower Fleet ELCC, not the Delta Method allocation.

Mr Carlberg indicated that it was his understanding that the Fleet ELCC is less volatile than the individual allocations, and that the Fleet ELCC is based on the lowest of the median and the full period results to reduce volatility, but the same approach is not used for individual facilities, so the volatility for the Fleet is counteracted, but the same is not done for the individual Facilities.

- Ms Koziol indicated that this was not the draft decision. The draft decision was to use the ELCC for the full Reference Period, which is driven by the exact same TIs that drive the Delta Method. There was no averaging and no median used in the method under the draft decision. The Rule Change Proposal was to use the lower of the median for the full period and the median of the separate years. The Panel considered that this approach will put too much emphasis on TIs in times that are low system stress.
- Mr Carlberg asked whether the Fleet ELCC would be less volatile because it was a fleet and composed of a lot more generators that were going to be more diversified?
- Ms Koziol indicated that RCP Support did not have enough data to confirm this.
- Ms Laidlaw indicated that the Fleet ELCC should be less volatile in theory, but the question was whether it is materially less volatile. The WEM does not have the thousands of facilities that exist in some American jurisdictions, it has 26 facilities that are dominated by six large wind farms, of which five are more or less in the same area. The WEM could experience a high stress day when the northern wind farms and Collgar fail at the same time, but it could also have a high stress event where Collgar and the northern wind farms do extremely well, which would drive an artificially high ELCC that could be a problem from a system reliability point of view. These were both risks, and the law of

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capacity is lost. The scenarios that the Panel tested in the Draft Rule Change Report did not show much variation in terms of ELCC.

relevant to the calculation. The question then becomes whether to allocate based on a different set of intervals, which would include intervals that, according to the ELCC method, are not critical intervals?

- Ms Laidlaw pointed out that Dr Shahnazari is correct that the average output of each generator is indicating some locational effects but indicated that allocation based on averages is not picking up diversity effects.

Ms White asked how demand in interval 100 compares to demand in interval one (e.g. is interval 100 still peaky?).

- Mr Nunn indicated that the peak is about 3,000 MW in the lowest TI under the ERA method, which is substantially lower than at the very peak.
- Ms Koziol indicated that this is what RCP Support is saying - the ELCC method does not calculate a high LOLP for these TIs, it is the LOLPs for the first 50 TIs that matter.

Mr Nunn indicated that there is not enough data. Mr Nunn doubted that AEMO would have any confidence in using 12 TIs as the basis for system forecasts, so how can there be confidence in using such a small number of TIs to allocate large amounts of capital for the purposes of investment?

- Ms Laidlaw pointed out that the Fleet ELCC sets the number of Capacity Credits allocated to intermittent facilities and the Fleet ELCC is determined from the same three events that drive the results for Collgar and the northern wind farms, and asked Mr Nunn if that means that the Panel should be thinking hard about adopting ELCC as our fleet capacity measure?
- Mr Nunn indicated that, in the absence of a lot of information, that it may make more sense to use a proxy, which is what the ERA is proposing. It recognizes the limited information that is available and uses a proxy rather than something that is razor-sharp and could drastically change from one year to the next.

The Chair asked whether that means the Panel should accept that a small number of TIs will set the ELCC, but should not accept using the same TIs for allocation?

- Mr Nunn indicated that if the fleet value for the ELCC could be changed to very low numbers next year if all of the wind farms rolled over, then that does not sound like it is a good method.
- Mr Carlberg indicated that it is his understanding that the Fleet ELCC is less volatile and that the ERA has discussed a number of methods to deal with this volatility, so it may be worth revisiting those methods.

The ERAôs Presentation[3]

ERA slides 1-3:

Dr Shahnazari indicated that the ERA has two points to discuss:

- issues related to the Delta Method, where the ERA has similar concerns to those raised by Mr Nunn; and
- the Panel's proposed method to adjust the COPT to have a total capacity equal to the Reserve Capacity Requirement, where the ERA thinks that approach may undermine system reliability.

ERA slides 3-8:

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	Dr Shahnazari repeated the analysis in terms of average performance based on top 50 peak demand and to 50 peak LSG TIs, similar to	

ignores this important information. Ms Laidlaw asked Dr Shahnazari if he could think of an approach that would provide a bigger sample but would not lose sight of the diversity issue, which is very important given how the WEM is laid out?

Dr Shahnazari indicated that this was not the reasoning that the Panel presented in the Draft Rule Change Report to discount the ERA's proposed allocation method. Dr Shahnazari indicated that one of the reasons that the Panel discounted the ERA's allocation method was that facilities at different locations have different correlation to demand and to other facilities. Dr Shahnazari agreed with this, but suggested that physical factors such as technology, engineering factors and location are reflected in facilities' average performance during system stress periods.

Ms Laidlaw indicated that the averaging of performance will pick up differences in performance of Facilities in different locations, but asked how will it address when one facility is located next to another, so they produce or fail to produce at the same time?

Mr Shahnazari asked the same question of Ms Laidlaw – how does the Delta Method address this? Dr Shahnazari indicated that he does not think that Delta Method can explain what Ms Laidlaw is saying because both the ERA's proposed allocation method and the Delta Method are heuristic and are not scientifically proven.

Ms Laidlaw pointed out that there are no scientifically proven methods.

Ms Laidlaw indicated that:

– the Delta Method accounts for both First-In ELCC (which is affected by each Facility's stand-alone performance against load) and Last-In ELCC (which is affected by the other facilities).

– If a Facility has high correlation to others, its Last-In ELCC will be lower than its First-In ELCC. If a Facility fits in well with the other facilities, and the other Facilities fill in the gaps in the Facility's performance, then its Last-In ELCC will likely be higher than its First-In ELCC. The First-In and Last-In ELCC use different information.

– RCP Support takes the point that there is a small sample size, but based on these points, Grasmere and Albany had extraordinarily high performance – their output was much higher than their average output. RCP Support agrees that these results might be volatile.

- If you look at the performance of Collgar and the northern wind farms, they do not seem to be particularly unusual. Both did well in some periods and not so well others. They complemented each other very well.
- The Last-In performance of the northern wind farms is much worse than their First-In, which is consistent with the effect of the correlation of those wind farms. When you look at the Last-In performance, they are affected by the other nearby facilities, which is reducing the benefit that they provide.
- RCP Support takes the point that, with another year of data, where a different set of peaks is possible, the northern and the eastern wind farms could do poorly or very well. A bigger and more diversified fleet in future would be less vulnerable to this sort of variation.

Mr Nunn indicated that you cannot tell whether there is a correlation between wind farms with three observations, this is not a correlation, it is just an observation.

- Ms Laidlaw asked whether you would expect correlation between facilities that are located together, and less correlation between facilities that are further apart.
- Mr Nunn agreed but indicated that this is not based on the data, just based on the known location of the Facilities.

Mr Nunn indicated that RCP Support is drawing on a good point – the importance of temperature and wind speed, which tell us about how facilities generate. It would be interesting to see whether system stress could be thought of in terms of temperature, which might derive a better data set than just looking at high demand periods. This could include observations on weekends.

- Ms Koziol indicated that RCP Support can investigate this, but drawing on AEMO's submission, suggested that there will likely still only be a small data set of high system stress intervals. Mr Nunn agreed but suggested it may move towards five or six observations.

Ms Grace Liu asked how the average performance level can reflect the diminishing incremental capacity contribution of a facility, especially if there are many facilities with similar performance profiles in similar locations.

- Ms Laidlaw indicated that this is the dilemma –a robust data set is preferred but there is also a need to reflect the diminishing incremental capacity contribution of facilities.

Mr Carlberg suggested that the benefit of signaling correlation to investors is diminished when the results under the Delta Method are

going to be so volatile, and that this volatility will likely outweigh any correlation effects.

- The Chair commented that the volatility is not necessarily just from the Delta Method.

Ms Donohue asked whether the ELCC method considers whether a plant was under constraint?

- Ms Koziol indicated that output values for facilities under a Consequential Outage would be replaced by an estimate from AEMO to reflect what it would have done if it was not constrained.

Ms Erin Stone asked whether introducing locational signals in the RCM ahead of NAQs being set is consistent with the protection of Scheduled Generators' property rights for the next ten years.

- The Chair indicated that the RCM does not provide property rights, so the Panel has not considered this, and that any questions on property rights should be addressed to EPWA.

Ms Bedola suggested that it makes sense that the allocation intervals are aligned to the ELCC intervals, and the issue is the limited number of stress intervals. Ms Bedola asked whether the seven years should be considered individually and have seven ELCCs?

- Ms Koziol indicated that the problem with this approach is that some years do not have any high system stress TIs from the perspective of the LOLP, so if you calculate the ELCC for a year that did not have high system stress, it will not represent an actual high system stress period, which is what the RCM is supposed to account for.

ERA Slides 9-11:

Dr Shahnazari presented the following quote fromixELCC f x p

that using the Delta Method to allocate the ELCC to individual generators does not acknowledge these risks.

Mr Carlberg noted that PJM also indicated that these risks should be managed in applying the Delta Method, in terms of practicality and price signals. Applying the Delta Method to individual generators does not consider this.

- The Chair indicated that it is RCP Support's understanding that PJM groups facilities mainly for calculation simplicity. PJM proposed transitional measures to deal with the risks that Mr Carlberg is referring to, but the FERC rejected these measures. Nevertheless, the Panel understands these risks and will consider them.

Ms Bedola stated that she understands that proposed facilities are taken out and assessed based on the additional value that they contribute to the fleet. Ms Bedola agreed with this but asked how the capacity certification would change in year two. In the first year, a proposed facility in the north country might not get many Capacity Credits because it does not add much value, but if nothing else was to change in year two, would it take CRC away from the other facilities in north country?

- Ms Koziol indicated that a proposed facility would be assessed in a second round. A proposed facility that is co-located with a lot of similar facilities would likely get a relatively low value while it is a proposed facility. Once it is a committed facility, it would be assessed with Everyone Else, so [illegible]

Item	Subject	Action
	o The Chair asked whether Ms Bedola was suggesting that the market should protect existing plant from new entrants? o Ms Bedola suggested that this is what the NAQ scheme is doing. Ms Bedola asked why someone should be impacted if another person ignores the locational signal? o Ms Donohue agreed that the NAQ locks in value. o The Chair indicated that the NAQ arrangement provides protection for pre-existing property rights in contracts under the Access Arrangement, and that providing protection to intermittent facilities from new entrants is well outside the scope of this Rule Change Proposal, and that this would need to be taken up with EPWA. o Ms Liz Aitkin asked whether sovereign risk had been considered. o Ms Laidlaw indicated that, if someone puts an Intermittent Generator near your Intermittent Generator, there is a chance that they are going to effectively reduce your capacity. If the two facilities had the same average output, their combined capacity value is unlikely to be double the current facility's capacity value. When you are talking about investor risk and sovereign risk, if someone else builds an intermittent facility that is very similar to yours, then your capacity value will be at risk, whether directly through something like the Delta Method, or less directly through the fleet value going down, all other things being equal. On the other hand, if another intermittent facility is built that is complementary to yours, then the collective capacity value can go up, and you will benefit from this. o Ms Aitkin indicated that this is the risk she was referring to, but there is also a risk from making rule changes ex-post investment, which will discourage investment. It represents a reasonably significant risk. Ms Aitkin asked whether the Panel had considered this in the drafting of amendments away from the ERA's proposal. o The Chair indicated that this had been considered, and that most of the risks that Ms Aitkin is referring to are inherent in the ELCC method rather than the allocation method. o Ms Laidlaw indicated that two things were being considered – the investment signals and sovereign risks, and power system reliability. Ar r m tt were b M ŭ hc l Ps o	

high stress TIs, so based on Mr Carlberg's comments, this would suggest that from System Management's point of view, the Fleet ELCC is suspiciously high.

- Mr Carlberg suggested that the volatility of the Fleet ELCC and of individual generators needs to be explored. Regardless, Alinta prefers the ERA's allocation approach, which acknowledges that the Fleet ELCC is going to change from year to year and implements measures to get a more robust forecast for the Fleet ELCC. If the Fleet ELCC is also driven by those three intervals, then system managers are going to have concerns that:

  the forecast is based on three observations, and

  the Fleet ELCC is going to be too high.

- Ms Laidlaw asked whether Alinta still supports the ELCC method; and Mr Carlberg indicated that different iterations of ELCC should be explored and if the ELCC method prevails, as it can under the ERA's approach, it needs to have measures to improve its robustness.
- The Chair asked Mr Carlberg what he means by robustness and Ms Laidlaw suggested that he means, for example, using the median of the seven years. Mr Carlberg indicated that is correct, using this as a proxy.
- Ms Koziol indicated that the concern is that the ERA's proposed allocation methodology is not a good proxy because it accounts for performance in irrelevant TIs. Periods of system stress and facility output are both driven by weather, so RCP Support does not see how using intervals of low system stress to approximate the output of facilities during periods of high system stress would make the allocation method more robust.
- Ms Koziol indicated that the RCP Support does not discount the points that Mr Carlberg and Mr Nunn are making – it shares concerns about the Fleet ELCC and the individual ELCCs being driven by a few events, and are looking for options to address this, but do not consider using low system stress TIs to be a good alternative.

Dr Shahnazari commented that there is no theory to explain that a Facility that has a larger delta between its First-In and Last-In ELCC should have a greater contribution system reliability. This is a heuristic that the Delta Method assumes.

- Ms Laidlaw indicated that this is not what the Delta Method is saying.

Ms Donohue indicated that moving to security constrained economic dispatch (**SCED**) is likely to change facilities' capability to contribute to high stress periods and asked if RCP Support had considered the

impact of SCED in any of the modelling? Badgingarra is frequently constrained, so as a constrained market is implemented and other generators are constrained, these Facilities may not be able to contribute during times of system stress through no fault of their own, so would this impact the results?

- Ms Koziol indicated that the ELCC method in the draft decision and the model both account for any reduced output due to constraints. The reduced value is replaced with an estimated value of what would have happened if there had not been a constraint. The NAQ process then accounts for network constraints, so RCP Support has not considered any impact of system constraints or SCED in its model.
- Ms Donohue indicated that the concern is more that moving to SCED could substantially change how plants operate, and that APA Group has experienced this with Badgingarra, so moving to SCED could substantially change some plant's operations.
- Ms Laidlaw suggested that the NAQ and RLM processes may be redesigned to better integrate the processes in the future, but that this is not going to happen for the 2021 RCC. Ms Laidlaw agreed that there are interactions between these processes – the RLM assumes an unconstrained capacity value that is then fed into the NAQ process. This is how the RCM was designed.
- Ms Koziol indicated that the Panel considered in the Draft Rule Change Report that the assumed input fleet for the RLM may be different from the actual fleet, including that that some facilities are assumed to be unconstrained but are subsequently constrained by the NAQ process. Changes to some facilities can affect the CRC of other facilities, negatively or positively. RCP Support's analysis indicates that the Delta Method reduces this risk but does not remove it. The Panel thinks that this is an acceptable risk if the differences are relatively small, but that this is something that needs to be further considered in the future.

Mr Carlberg commented that he sees that output during low system stress periods should not influence results, but he thinks that there may be some periods of low system stress that could be used to approximate conditions of higher system stress. This is probably what the ERA was considering in using peak demand and peak LSG intervals. To address the data issue, approximations should be used as a proxy for the conditions in peak TIs.

- Ms Koziol indicated that RCP Support it is taking this on board and will investigate any proxies that it can identify. Ms Koziol asked stakeholders to advise if they have any other suggestions for a proxy, in addition to looking at high temperature days.

Item	Subject	Action
	The Chair did not receive any further questions or comments and nut ʷ┼ iuss aclssrm ɒ N ɪ ɒ 'Y	