Community for Accurate Impact Assessment of the Dalton Power Station (CAIAD)
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Director, Major Infrastructure Assessment
Department of Planning
GPO Box 39
Sydney NSW 2001

Dear Sir/Madam,

SUBMISSION IN RESPONSE TO THE ENVIRONMENTAL ASSESSMENT OF THE AGL DALTON POWER PROJECT

The Community for Accurate Impact Assessment of the Dalton Power Station (CAIAD) hereby submits this response to the above Environmental Assessment report.

We object to the proposal on a number of grounds, as follows:

i. Inaccuracies, inconsistencies and omissions in the Environmental Assessment (EA) report particularly regarding noise and air quality assessment.
ii. Excessive cumulative negative effects of building Stage 1 and Stage 2 which effectively amounts to building two power stations on the one site with commensurate impacts on air quality, noise levels and scarce water resources.
iii. Insufficient account of the adverse meteorological conditions (such as temperature inversions) of the region in the noise and air quality assessment.
iv. The maximum cumulative 1 hour level of NO_2 emissions exceeds the Australian standard summer temperature adjusted limit of 214μg/m^3.
v. Lack of verified noise emission data for the turbines and stacks which have never before been used in Australia. There is a track record of power companies incorrectly modelling noise impacts on communities, with people subsequently forced from their homes by intolerable noise levels, and therefore extensive empirical data needs to be obtained and independently and expertly assessed.
vi. There is no justification for the power station, and certainly not for one of this scale, on the basis of supply need in the electricity market. No additional capacity is needed in NSW for seven years.
vii. The proposal is inconsistent with the aims of Upper Lachlan Shire LEP 2010 to: "encourage conservation of natural resources"; and "promote the use of rural resources for agriculture and primary production", as electricity generation at the location risks depleting water resources that are currently available for interdependent ecosystems and agriculture.
viii. Inadequate community consultation, with impacts on the community not properly identified and disclosed.

As such CAIAD asks for:

A. An inquiry into the Uranquinty power station to determine why the actual noise and vibration impacts have exceeded those predicted in the Uranquinty Environmental Assessment report, and the resulting economic impacts for that community.
B. An independent expert assessment of the noise, vibration and air quality impacts once specific turbines and stacks to be installed are confirmed. It is understood that the turbines have been confirmed as General Electric 9FA turbines. However actual stack configuration is uncertain. The community asks that prior to construction, the sound power levels of the actual plant is verified by 'real world' empirical data to ensure claimed outputs are achievable.
C. An independent expert assessment of the appropriate acoustic model and modelling parameters for adverse meteorological conditions, given that worst case meteorological conditions for noise propagation and air quality occur frequently in the region.
D. An enduring limit on the size of the power station to Stage 1 with operation not to exceed 15% of the time (and 5% of the time where water is required).
E. Any approval to contain stipulations that noise (both A-weighted and C-weighted) and air emissions may not exceed NSW government limits during typical as well as adverse weather conditions. Given that the proposal is based on assumptions about emissions, there is considerable risk to the community, which means careful specification, monitoring and enforcement of limits will be essential.
F. An independent expert assessment of available water in the area to ensure existing water users and interdependent ecosystems are not adversely impacted by the project.
G. A letter to all residents within a 6km radius informing them of AGL's proposal to build the Dalton power station. The letter needs to inform the public about the potential negative impacts for neighbouring properties and the measures AGL is taking to ensure negative impacts are minimised. Also we ask that residents 10 km away, identified as impacted with peak levels of pollutants from the power station, are contacted and given an assurance that pollution levels will be well below recommended levels.

It is appreciated that there needs to be a balance between development of industry and preservation of amenity. This balance can be achieved with an accurate assessment of the impacts, limiting negative impacts to NSW Office of Environment and Heritage (OEH) and the World Health Organisation (WHO) guidelines, and avoiding cumulative negative impacts by restricting the development to Stage 1.

Please contact me if I can be of additional assistance in relation to the information presented in this submission.

Yours sincerely,

Andrea Strong
For CAIAD 19 September 2011

Submission to the Proposed Development of a 1500MW Open Cycle Gas Turbine Power Station at Dalton

By the Community for Accurate Impact Assessment of the Dalton Power Station

1. Introduction

There are a number of community concerns about the construction and operation of a 1500MW open cycle gas turbine power station at Dalton:

ix. Inadequate community consultation;
x. Inaccuracies, inconsistencies and omissions in the Environmental Assessment (EA) report;
xi. No justification for the power station;
xii. Noise and vibration impacts during construction and operation;
xiii. Impacts on the scarce water resources of the region;
xiv. Air quality impacts during construction and operation;
xv. Site night lighting impacts; and
xvi. Exaggeration of job benefits to the region.

The proposed Dalton gas fired power station, if constructed, will be the biggest open cycle gas fired power station in Australia with technology not before trialled in Australia. The proposed project is in two stages: Stage 1 with a capacity of 750MW; and Stage 2 with a capacity of 1500MW. This is equivalent to building two power stations on a single site.

AGL say they have decided to construct with the larger noisier F class turbines, specifically, General Electric (GE) 9FA turbines. According to AGL these turbines have been installed in China, Eastern Europe, South America and Western Europe. The China Power Contractor website[1] indicates that all GE 9FA turbines are manufactured in China by Harbin Power Equipment Company (HPEC)[2].

There is an unacceptable degree of risk to the environment and existing landowners by constructing a gas fired power station of unprecedented size in this rural area. The cumulative negative impact of the additional capacity in Stage 2 raises serious concerns for the preservation of amenity and water resources of the region.

Concerns arise because of other cases where open cycle gas fired power stations have been installed in rural areas and have subsequently caused serious problems for neighbouring properties. In the

[1] http://www.china-power-contractor.cn/GE-9FA-255mw-Gas-Turbine-Generator.html

[2] HPEC has had environment issues with developments with which it has been involved in the past, including the massive Three Gorges Dam in China and the Merowe Dam in Sudan (Oster 2007)(Sudan Tribune 2003)(Macartney 2007). As referenced in http://www.greenwashreport.org/downloads/HRL_Report_08.pdf

case of the much smaller Uranquinty power station the actual noise and vibration impacts have exceeded those predicted in the Uranquinty Environmental Assessment report causing people to leave their properties (see Appendix A).

Further, there are a number of fundamental errors and omissions in the EA report which means it cannot be relied upon to assess the environmental impacts of the Dalton power station. The review of the EA process and report follows.

2. Inadequacy of community consultation

2.1 People not contacted. A number of affected land owners only heard about the proposal by word of mouth after the initial public meeting in April 2011. There was no notification by mail to affected land owners. Names and addresses of affected landowners could have easily been obtained from Council and the location of dwellings is well documented on the local Bushfire Brigade map.

2.2 People not identified as impacted. Just a few months ago and after the first public meeting, when asked about the impact of the power station on the closest neighbour to the east of the site, AGL hadn't realised that the dwelling existed. AGL said they had thought the buildings to the east of the site were only sheds. It is almost unbelievable that a $1.5billion project could get so far through the assessment process and not identify one of the closest neighbours, particularly given that consultation with the community is an essential part of the assessment process.

Serious inadequacies in the community consultation process are obvious with AGL failing to identify even their closest neighbours, and failing to contact all impacted residents.

3. Inaccuracies, inconsistencies and omissions in the Environmental Assessment Report

3.1 Leafs Gully Image on the front of the Dalton EA. The image on the front of the EA which is presumed to be an artist impression of the proposed Dalton power station positioned in the landscape behind eucalypts, is in fact an image of the Leafs Gully power station near Appin, taken from the front cover the Leafs Gully Power Station 2009 Environmental Assessment. Leafs Gully is a 300MW power station. The proposed Dalton power station is a 1500MW power station, some five times bigger, therefore with a very different visual impact. Placing the Leafs Gully image on the EA documents and EA CDs is deceptive and very misleading to the public. The general reaction of the public looking at the image is that 'it doesn't look that bad' and 'perhaps there is nothing to worry about'. By not showing the public the true image and scale of the power station, AGL is avoiding scrutiny and failing in its obligation to consult.

3.2 No artist impression or elevation drawings of the proposed development. Apart from the wrong image on the front cover, there is no artist impression of the power station included in the EA. While a plan of the site has been included, showing dimensions roughly 500 m by 700 m, no elevations showing reference levels are provided. Some distant views are included as part of the visual assessment, but nothing is provided to show the bulk and scale of the structure with reference to the topography. An artist's impression of the much smaller 210MW Tuggeranong power station is included here in Appendix C of this submission.

3.3 No documentation of AGL's comprehensive review of existing gas turbine developments. The EA states "AGL has undertaken a comprehensive review of existing gas turbine developments in Australia and has also reviewed more than 12 alternative sites for the proposed development in NSW" (AGL and URS 2011[3], pES-3). Yet the comprehensive review is not contained in the body of the report. Can the community get a copy of the comprehensive review? It would be valuable for the community of Dalton to examine AGL's review of existing gas turbine developments because of the adverse environmental impacts, particularly concerning low frequency noise and vibrations, which the residents of Uranquinty have experienced from the operation of the 640MW Uranquinty power station.

3.4 The Uranquinty power station is referred to as a "proposed development" in the report. Given AGL's comprehensive review of existing gas turbine developments, it is surprising that in the EA they discussed the Uranquinty power station as a "proposed development" when it was commissioned in 2009 (AGL and URS 2011, p3-20). This raises questions about what review of existing gas turbines has been done by AGL, if it is not known that the Uranquinty power station has been operating for 2 years.

3.5 Incorrect addresses of impacted residents in the EA report. Many of the addresses reported in the assessment are incorrect. The addresses on Alton Hill Road (which is sometimes referred to as Alton Hill Lane) are all Gunning rather than Dalton. Also a number of attendees at the community meeting, that neighboured the site, commented that the Dalton addresses were incorrect.

3.6 Community not aware of the wind turbines 5 km from the site. The EA states that other major projects in the Upper Lachlan Shire Council area are all wind farms between 5 and 20 km from the power station project (AGL and URS 2011, pES-16). The community are not aware of any wind farms 5 km from the site but for those residents sandwiched between the wind farms and the power station, the cumulative negative effect would be significant.

3.7 Offset area only to the west of the site. The proposed biodiversity offset area is only to the east of the site. In the interests of screening and reducing noise impacts we ask that consideration be given to tree planting on the east ridge line and east north-east of the site to provide additional protection to dwellings "J", "G" and "F".

[3] AGL and URS (2011), AGL Dalton Power Project Environmental Assessment (2011) here forth referred to as AGL and URS (2011) or the EA report.

3.8 Site assessment identifies 'Geotech' problems for the site. In Table 3-15 the Dalton site is identified as having geotech problems. The status is identified as 'caution' stating that the site is feasible but there are potential constraints or significant costs with the site selection.

This is inconsistent with Chapter 8 which states "there appear to be no geotechnical aspects that would preclude the use of the site for a gas turbine power station" (p 8-4).

3.9 AGL's environmental record is in question. It is stated in the report that AGL's environmental record is supported by AGL never having proceedings brought against it in court. However this is incorrect. AGL is currently in court with AGL Energy's Gloucester coal seam gas project. The proceedings are being brought against PAC and AGL in the New South Wales Land and Environment Court by the Barrington – Gloucester – Stroud Preservation Alliance.

4 No justification for the power station on the basis of 'State need'

4.1 Error in the year when the LRC point is reached in NSW. The justification provided by AGL for the project is contained in *Chapter 2: Project Need and Justification* of the EA. Reference is made to the report issued annually by the Australian Electricity Market Operator (AEMO) entitled *Electricity Statement of Opportunities 2010* (ESOO 2010) (AGL and URS 2011, p2-1).

The EA says the:

> "The ESOO includes a supply-demand balance ....indicating the ....Low Reserve Condition (LCR), when additional capacity may be needed to maintain the established level of electricity supply reliability.
>
> If no capacity in addition to that already committed is made available to the market, this point is reached for NSW somewhere around 2014 and 2015".

However this is incorrect. The ESOO 2010 says the LRC point for NSW is reached in 2016-17 for the medium and high growth scenarios and not until 2017-18 for the low growth scenario (ESOO 2010, Table 1). The latest ESOO (ESOO 2011)[4] was released August 31, 2011 and pushes the LRC for NSW out to 2018-19 for all growth scenarios (ESOO 2011 Table 1, p10 Executive Summary). Therefore for at least for the next seven years (from 2011 to 2018) there is no need for this project to provide 'electricity supply reliability'.

4.2 Potential problems for the efficient operation of the electricity market if AGL holds a large amount of peaking plant. The other justification given by AGL for the project is that during peak periods AGL can incur heavy financial losses by having to pay other generators 200 times the

[4] http://www.aemo.com.au/planning/esoo2011.html

cost of base load power. This amounts to AGL building capacity to strategically position itself in the electricity market. Further it raises questions about the efficient operation of the electricity market if one participant has control over the supply of such a large amount of peaking capacity in NSW. (The proposed 1500MW Dalton Power Station is the same size as the Murray Snowy Hydro).

Presumably there are hedging contracts available to AGL to manage peak demand price risk, instead of wasting resources building capacity before it is needed.

A better use of $1.5billion in the electricity market would be to upgrade customer metering equipment so customers can see and respond to price signals on the half hour and so reduce power demand in peak periods.

4.3 Failure to identify Canberra and the ACT as a major usage area as a justification for the development. Electricity usage and the transmission network are discussed, in the chapter on project need and justification. The main centres of peak demand are identified as Sydney, Newcastle and Wollongong (AGL and URS 2011, p2-3). Surprisingly Canberra and the ACT aren't mentioned, particularly as one would think Canberra and the ACT would be the major usage area in the region. Is there a reason Canberra and the ACT aren't mentioned as demand centres for the region?

4.4 Inconsistent statements about the power station operation. With regards to the operation of the power station, the EA says a number of conflicting things. In the executive summary it is stated: "It is envisaged that the power station would operate in open cycle mode during times of peak electricity demand, typically for less than 15% of the year" (AGL and URS 2011, pES-1). Also in Chapter 2 it is stated "Operation of the Dalton power station for up to 15% of the year allows for ....rare and extreme events."[5] (p2-9). However in Chapter 1 it is stated "Gas turbines...would typically operate for 15% of each year, with the potential for more extended operation." (p1-1).

In the first and second case the EA is saying the plant would rarely operate more than 15% of the year. In the third case it is saying 15% of the year is typical but more operation is possible. This needs clarifying. The environmental assessments on noise and air quality have assumed operation at no more than 15% of the time and the environmental assessment for water management has assumed water demand for operation for only 5% of the year.

The Leafs Gully EA states the Leafs Gully power station will not operate above 15% of the time without consent.

[5] There is less than half a page in the EA devoted to discussing the expected percentage of time the power station will operate. The estimation of not more than 15% is based on past experience. The EA lacks analysis of the percentage of time open fired gas turbines might be expected to operate in an electricity market with: 1. an increasing proportion of less reliable wind and solar power generation; and 2. a carbon price. Some analysis on electricity generation and capacity installed by technology type out to 2029/30, assuming different scenarios, is provided by the AEMO (National Transmission Network Development Plan 2010).

The Dalton EA consistently states that the analysis takes a conservative approach by looking at the worst case scenario. Given that the environmental assessment for the Dalton power station has been done assuming that the power station will not operate more that 15% of the time, and more than 5% of the year where water is required, the actual operation of the power station needs to be limited to this[6].

Operation for 15% of time is already a significant impact on the community. As the power station will be operating in peak periods, it will rarely operate on weekends, or after 10pm or before 6am during the week. Therefore during the week when people are awake it will be operating up to 32% of the time.[7]

5. Noise and vibration impacts during construction and operation

5.1 Assessment process ignores greater adverse impacts arising from very low ambient noise in a rural environment. The NSW Industry Noise Policy (INP) assessment process has problems for people living in a rural area because it doesn't take into account the very low ambient noise levels in the bush. People in urban areas don't seem as affected by these developments as farmers. This may be because country towns have a higher level of ambient sound. Often farmers may be closer to the developments, but an important factor seems to be that they are going from a 'no noise environment' to a 'noise environment'. This isn't taken into account in the INP assessment process as the Rating Background Level (RBL) of noise, if found to be less than 30 dB(A), is raised to 30 dB(A). For instance at Location K near the Dalton site, the RBL during the day and at night is found to be 25dB(A). As this is less than 30dB(A), for assessment purposes, this is raised to 30dB(A) and the Intrusive Noise Criteria is set at 5 dB(A) above this, i.e.35dB(A). This allows the power station to increase noise levels by up to 10 dB(A) (35 dB(A) criteria less 25 dB(A) actual RBL) which is 10 times more noise than our current noise levels[8].

Is there research that points to the need to leave RBLs at their measured levels for the purpose of assessing noise intrusiveness? It is noted that the WHO guidelines for community noise states that noise has the potential to disrupt tranquillity and "existing quiet outdoor areas should be preserved", *http://www.who.int/docstore/peh/noise/Commnoise4.htm*. On many of the surrounding properties, waterways and old remnant stands of trees have been fenced off for conservation purposes, and should have their tranquillity preserved.

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[6] When operating 15% of the time, the cumulative maximum NO_2 levels for 1 hour are estimated at 240.7 ug/m^3, very close to the OEH criteria of 246 ug/m^3 and higher than the WHO limit of 200 ug/m^3. As the EA hasn't examined the impact on the environment of exceeding the assumed maximum time of operation, the maximum time of operation needs to be limited.

[7] There are 8,760 hours in a year. 15% of the year is 1,314 hours. Taking out the weekends and time between 10pm and 6am leaves 4,160 hours during the week when people are awake. Of this time, the power station could be operating up to 32% of the time.

[8] As noted, an increase in noise levels by 3dB is a doubling of the noise, while an increase in noise levels by 10dB is a 10 fold increase in noise levels.

5.2 Complete absence of vibration assessment. AGL state that they haven't looked in detail at vibrations from the plant. They say "Gas turbine plant operate at high rotational speed and are very sensitive to vibration and hence very well balanced preventing vibration at levels that could be intrusive to surrounding receptors." (AGL and URS 2011, p12-7). However Uranquinty residents comment they can feel the vibrations through the ground and that windows rattle even as far as 4 to 5km away.

They say:

> "The vibrations are often felt separately to the low frequency noise. They can be noticed through the rattling of windows or felt through the body. If you stand in certain parts of our house you can feel the vibration reverberate through your body from the floor. It is quite an unpleasant feeling when a combination of both vibration & low frequency is felt. Neighbours with 'hearing loss' (which is many of the male farmers) are affected more by the low frequency emissions than those with 'full hearing'".

Complaints about vibrations have also been made about the Laverton power station. This was one of the reasons it was ordered to remain in shutdown for certain hours on weekdays.

The vibrations may be coming from the turbines or the stacks. It is thought the vibrations in the case of the Uranquinty site are coming from the stacks. Vibration assessment is a very important part of the environmental assessment. The project should not be approved until a thorough and independent assessment of vibrations has been undertaken.

5.3 The EA report finds that the power station exceeds the INP low frequency noise emission and seeks to lower the standard. The NSW INP guidelines say low frequency noise needs to be considered if the difference between the A and C weighted levels is greater than 15. The NSW guidelines are less stringent than the WHO guidelines which state that low frequency should be considered if the difference between the A and C weighted levels is more than 10 (http://www.who.int/docstore/peh/noise/Commnoise4.htm).

Although the Dalton Gas Fired power station is shown to exceed the INP difference approach for assessing low frequency noise impacts, the EA argues recent literature by Broner (2008) indicates "the INP difference approach is not suitable for use in assessments when the noise levels are low" (AGL and URS 2011, p12-24) – and so a less stringent control can be applied.

This is very surprising, particularly with the number of families in a 2.5km radius bought out by the recently commissioned Uranquinty Gas Fired power station because of intolerable low frequency noise levels, presumably with that project approved under the current set of noise limits (i.e. the INP difference approach). Residents have experienced the effects of the low frequency emissions through nausea, faintness and "vertigo".

As a consequence, five families neighbouring the Uranquinty gas fired power station are gone, two more families are in negotiation to go, and another two are being paid compensation. Also

the recent Four Corners report *Against the Wind* (25/7/2011) indicated a number of people have been forced from their homes by low frequency wind turbine noise because of health problems. Further the low frequency noise from the Laverton power station on the outskirts of Melbourne was impacting so badly on neighbouring office workers in 2007, that the power station was ordered by the Victorian government to remain shutdown on weekdays between 8am and 5pm.

From this anecdotal evidence, it seems the controls on low frequency noise are not tight enough. If the noise limits are too stringent now, as AGL seems to be saying, it begs the question why people are finding the noise intolerable and abandoning their homes.

The Broner (2008) paper can no longer be the most current literature available. What is the current literature saying about low frequency noise and annoyance? Is there literature pointing to the need for even more stringent controls?

There is a bias in the environmental assessment process for proponents, with considerable research resources at their disposal, to find and generate literature that makes a case to lessen the noise controls on proposals. In no circumstance when controls are met, do AGL and URS say, 'but recent literature points to a more stringent control being necessary'.

For the sake of getting the correct balance between development and amenity, it is vital that if Government noise limits are exceeded, limits aren't relaxed.

5.4 Possible errors in worst case scenario noise modelling. The EA report says that adverse conditions scenarios for noise impacts have been examined. The results generally show a 3 to 4 dB increase in noise levels, with one case (Receptor J – Scenario D) showing a 5 dB increase in adverse conditions.

This is well below what would be expected. The NSW INP says that "Certain meteorological conditions may increase noise levels by focusing sound-wave propagation paths at a single point. ... These meteorological effects typically increase noise levels by 5 to 10 dB, and have been known to increase noise levels by as much as 20 dB in extreme conditions, thereby causing a significant noise impact on residents"
http://www.environment.nsw.gov.au/resources/noise/ind_noise.pdf, p 31.

Therefore if the average of adverse impacts from meteorological effects is 5 to 10 dB and up to 20 dB, it is very surprising that this noise modelling only shows a 3 to 4 dB increase.

The apparent underestimation of the adverse weather condition noise impacts could be because of two reasons: the acoustic computer model selected to simulate noise impacts is invalid; and/or the parameters chosen to model the adverse impacts are incorrect.

Noise has an ability to carry in the atmosphere in the Dalton area. Residents say they can hear distant noises loudly on clear frosty nights.

Neutral and adverse conditions are defined in the EA as (see Appendix G of the EA report, Table 5-5):

Scenario	Temperature	Relative Humidity	Pasquill Stability Class	Wind speed
Neutral: Day	25	60	D	0
Neutral: Night	10	75	D	0
Adverse: Day	25	60	C	4
Adverse: Night	10	75	F	2

The temperatures and relative humidity in the adverse scenario are identical to those for neutral conditions. However literature indicates for day and night adverse weather conditions a default of 10 degrees C and 70% relative humidity should be used (Kaliski and Duncan 2010).[9]

It is not clear how neutral conditions are defined. Certainly neutral atmospheric stability, but do neutral conditions mean average temperatures, humidity and wind conditions of the region? If so, a wind speed of 0 m/s is not average. In the air quality assessment (AGL and URS 2011, Appendix C) the average wind speed of the region is reported as between 4.06 and 4.39 m/s for the years 2000 to 2006, with wind speeds exceeding 7.5 m/s a significant proportion of the time (Figure A-1). Also it is noted that across all seasons, wind speeds average between 5.7 and 8.8 m/s for 16% of the time between 7am and 10pm (the period the power station is likely to operate) (Appendix G: Wind Rose analysis – All seasons). It is not clear that these conditions have been considered in the noise modelling.

In the NSW Industry Noise Policy it is stated "Where inversion conditions are predicted for at least 30% (or approximately 2 nights per week) of the total night time in winter, then inversion effects are considered to be significant and should be taken into account in the noise assessment." Appendix C of the NSW INP states that the noise assessment needs to "determine the percentage occurrence of atmospheric stability category F or G temperature inversions" for areas where the rainfall is >500mm (Appendix C, p74).

The Dalton power station noise assessment provides no estimate of the G class stability category that is referred to in the NSW INP. Stability class F is stated to occur 70% of the time in the evenings, and 65% of the time at night (Noise Assessment Appendix G, Appendix B contained in Appendix G). Does the G class stability category occur at Dalton and with what frequency? If it does occur, what does the noise modelling indicate about the noise impacts?

It is known that noise varies with wind gradient, temperature inversions, humidity and temperature. An expert in this field, who is also familiar with the functioning of acoustic computer simulation models, is needed to say exactly what parameters and simulation model will provide an accurate

[9]Atmospheric absorption is a function of temperature, humidity, and pressure. For ... modelling, we use a default of 10 degrees C and 70% relative humidity, as this generally yields the lowest attenuation (from ISO 9613-1), Kaliski and Duncan (2010). http://acousticecology.org/wind/winddocs/noise/kalinsky_annualized%20wind%20farm%20sound%20levels.pdf

estimate of adverse conditions, given the specifics of the meteorological condition of the area. Nevertheless with respect to parameters, it would seem important to consider a day time case with temperatures at 10 degrees C, 75% humidity[10], and high wind gradients;[11] and a night time case with the same temperature and humidity, but a strong temperature inversion.[12]

5.5 If you double the size of power station you double the noise so the Dalton power station can be expected to be more than twice as noisy as the Uranquinty power station. The proposed Dalton gas fired power station at 1500MW, if constructed, will be the biggest gas fired power station ever built in Australia. If you double the turbines you double the noise.[13] Stage 2 will be twice as noisy as Stage 1.

The Uranquinty power station at 640MW is less than half the size of the proposed Dalton power station. Nevertheless it has not been able to meet the EPA noise limits once commissioned despite retro fitting noise abatement measures. The owner of the Uranquinty power station is now in litigation with the turbine manufacturer. If Uranquinty can't meet noise limits with a smaller number of the quieter E class turbines and AGL say that they are proposing to construct with a larger number of the larger noisier F class turbines, then it would seem impossible to prevent unacceptable adverse noise impacts on neighbouring properties.

5.6 The Dalton power station is a greater distance from dwellings than the Uranquinty power station but it is more than twice as big and not all residents are protected by distance. AGL argue that they have done a better job than the Uranquinty gas fired power station at buying surrounding properties to ensure a better buffer between impacted neighbours. This is not entirely the case. There are three dwellings less than 2.5km from the Dalton site and many a little further out, including the town of Dalton 3.7km away. As residents 2.5km away have been forced from their homes in the case of the smaller Uranquinty power station, it would seem the proposed AGL power station, being more than twice as large, will cause significant adverse noise impacts. A map showing the location of residences near the Dalton power station site is shown in Appendix B of this submission. A map showing the location of residences near the Uranquinty power station site, where families have left their homes, are in negotiations to leave, or are being paid compensation for noise, is shown in Appendix A of this submission.

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[10] See footnote above.

[11] Wind gradient can have a pronounced effect upon sound propagation in the lower atmosphere. http://en.wikipedia.org/wiki/Wind_gradient#Sound_propagation

[12] http://en.wikipedia.org/wiki/Inversion_(meteorology); http://geography.about.com/od/climate/a/inversionlayer.htm

[13] Noise is measured in decibels (dB) and the dB unit uses a logarithmic scale. If one machine emits a sound level of 90 dB, and a second identical machine is placed beside the first, the combined sound level is 93 dB. Therefore doubling the sound energy will increase the decibels by 3. A 10 dB increase in sound means sound has increased by a factor of 10. http://www.ccohs.ca/oshanswers/phys_agents/noise_basic.html. It is also noted that sound drops 6 dB as distance from the source is doubled.

5.7 Farming property is not just the dwelling but also the agricultural land so sound proofing homes is not the answer. AGL are talking about double glazing windows of farm houses that are affected by the noise, but this is not the answer. The homes that AGL is proposing to sound proof with double glazing are not new. The sound will go straight through the walls.

Farmers spend much of their time outdoors and their farming property is not just their home but also their place of work - their office. The sound proofing needs to happen on the power station itself rather than on homes. If agricultural land and homes are significantly affected by noise it will lower property values. The noise needs to be controlled or significant compensation needs to be paid to indemnify against lower property values.

5.8 Other examples of power stations failing to meet noise controls once constructed. The inability of the Uranquinty gas fired power stations to meet noise controls once in operation isn't an isolated incident.

5.8.1 Alice Springs

The submission by Canberrans for Power Station Relocation (CPR) Inc to the development proposal for the Tuggeranong 210MW gas turbine power station says the proposed turbines when installed actually produced 130.1 dBa rather than the 87 dBa as claimed in the Noise Assessment. They say that ..

> the Titan 130, installed at the Ron Goodin Power Station (RGPS) in Alice Springs, "produces 103.1 dBa and they apparently cannot get it anywhere near the suggested 87dBa. This is detailed in the comprehensive report which was published in January 2007 (Full report - http://www.powerwater.com.au/news/media_releases/2007/1001_noise_report_ron_goodin_power_station.htm)
>
> On page 7 of the RGPS report it states: This real world example indicates that a Titan 130 produces levels somewhere between 99.2 and 103.1 dBa which is much higher than Bassett's base data of 87dBa. This once again, calls into serious question the quality of the Noise Assessment.
>
> This situation is even more extraordinary when you consider that the above report was commissioned AFTER approximately $800,000 was spent in an effort to reduce the noise to an acceptable level.
>
> They failed, so the generator is being moved 25 km out of Alice Springs. Full details can be found here:
> http://www.powerwater.com.au/news/ron_goodin_power_station.htm ....."

5.8.2 Laverton

The original licence for the Laverton North power station only allowed the power station to operate for 10% of the year, but in May 2007 the Victorian Civil and Administrative Tribunal ordered that the plant remain shutdown on weekdays between 8am and 5pm, due to the neighbouring offices being affected by the level of noise and vibration. The restriction on

operation was removed in July 2007 because of the drought which was impacting on alternate hydro peaking capacity.

> Herald Sun, May 11, 2007:
>
> "**A POWER station that supplies extra energy in the summer peak has closed in business hours because of health risks. By** Wayne Flower
>
> The Snowy Hydro gas-fired power station in Laverton North will halt at 8am today after Victorian Civil and Administrative Tribunal deputy president Helen Gibson issued an interim enforcement order.
>
> The order follows complaints by office workers across the road from the plant about the level of noise and vibration emanating from the unmanned station.
>
> Metroll Victoria general manager Frank Collett said most of the company's 20 office staff had reported headaches, nausea, ear aches and other adverse health effects since the plant fired up last November.
>
> The order, which will remain in place until at least July 29 when the matter heads back to VCAT, means the plant will be unable to operate between 8am and 5pm on weekdays."
>
> http://www.heraldsun.com.au/news/victoria/health-risk-to-close-power-plant/story-e6frf7kx-1111113511468

5.9 Noise inputs for noise assessment have not been independently verified. The EA report says the sound power levels of equipment have been provided by AGL and that the sound levels reported have been attenuated due to proposed noise mitigation measures (AGL and URL, Appendix G, 2011, p29).

While URL says the mitigation measures are best practice (Appendix G, p 31), there is no reference to URL independently verifying whether the attenuation of noise from the proposed mitigation methods is achievable. The manufacturer's specification for noise data, before attenuation, for the turbines and stacks, is not included in the assessment.

Reference is made to 109F Class turbines in the noise assessment, while in the air quality assessment manufacturer's emissions data was sourced on General Electric (GE) 9FA turbines. It is not clear if there is an inconsistency here.

Quite extraordinarily in a footnote to Table 5-4 (Appendix G) it is stated that the "Sound power level of the exhaust stack has been estimated based on the maximum cumulative sound power level the site can generate in order to meet noise limits. To ensure the compliance with the noise limit, sound power level of exhaust stack opening and body combined should not exceed 110 dB(A)". This assumption and subsequent testing seems completely without scientific rigour. It is assumed the stacks wont emit more than 110 dB(A), and then this figure is put into the model to see if it exceeds the noise limits. By assumption it doesn't.

This is a serious and fundamental flaw to the integrity of the noise assessment. As such, no reliance can be placed on these results. It is particularly alarming as noise from the stacks seems to be what is causing people to leave their properties at Uranquinty. The noise assessment needs to be redone with the turbine and stack configuration specified and noise emission data verified by an independent expert.

(The Office for Environment and Heritage say it is common place for proposals to assume plant is able to achieve noise limits. When the project is approved, the proponent goes out to the market and sources plant that can meet these noise limits. If the sourced plant fails to meet limits when installed, then the proponent is required to retro fit abatement measures and can litigate the supplier.

This process creates significant risk for communities.

A critical part of this process must therefore involve the Government clearly specifying, monitoring and enforcing limits to ensure compliance once the plant is constructed. In the case of the Dalton power station, it is critical that limits on A weighted and C weighted noise during typical and adverse weather conditions are specified, monitored and enforced.

At the same time an independent expert assessment of the ability of specified plant to perform as stated, before construction, would go some way towards reducing risk. Given the Uranquinty, Laverton and Alice Springs experiences, any theoretical modelled data should be confirmed with empirical data from actual 'real world' operating power stations with equivalent configurations and mitigation measures. The assessment needs to consider the case of all turbines running simultaneously and at full capacity and any amplification that the configuration may cause.

Alternatively, a credible threat that the power station will be shut down, (irrespective of its build cost), if it fails to meet noise guidelines, would encourage proponents to get it right. The current situation where those affected are bought out by the power station operator at a pre power station land price, is an insufficient deterrent to control noise. Compensation needs to be sufficient to act as a deterrent and to compensate families for the social cost of leaving the community as well as reduced land values).

5.10 The community response to the noise simulation. At the Community Information Day, the last weekend of August 2011, URS and AGL brought along a noise simulator, which simulated the noise of both Stages 1 and 2. For most people Stage 1 was only slightly audible but you could hear Stage 2. It was a low rumble like an earthquake. A number of people were disappointed they could hear Stage 2 and thought the noise might get annoying[14].

[14] Annoyance is an adverse health impact according to the definition of health by WHO. http://www.euro.who.int/__data/assets/pdf_file/0004/131809/e94731.pdf

6 Impacts on the scarce water resource of the region

6.1 Assumptions for modelling water consumption are inconsistent with the rest of the EA. The analysis of water usage is based on an assumption of water demand for operation for 5% of the year. This is inconsistent with other environmental assessments presented in the report assuming the power station operates 15% of the time. When questioned on this, AGL said that water is required to improve thermal efficiency of the power station only when ambient temperatures are high, i.e. in summer. However when discussing the expected operation of the power stations the EA refers to the summer of 2007/08 when peaking requirements were for 10% of the year. Therefore the assumption that the plant won't operate with water more than 5% of the year is likely to underestimate water requirements in some years. The EA says the historical average of AGL peaking plant is 3% of the year (AGL and URS, 2011, p2-9). This suggests peaking plant operated an additional 7% of the year over the summer of 2007/08.

The overall water requirements of the site are summarised in Table 14-5 of the report and range between 15 and 106 ML/year, assuming water is only required for 5% of the year. If the conservative approach is taken and it is assumed that water is required all the time the plant is operating, water demand could be up to 318ML/year with E class turbines.

AGL have said that through their tendering process they are planning to construct the larger noisier F turbines. The water usage with these turbines operating 5% of the year is 15ML/year for Stage 1 and 29ML/year for Stage 2. A beef cattle farm on 500Ha in the Dalton area would use about 3ML/year[15]. Therefore Stage 2 represents a 10-fold increase in water taken from the environment relative to the existing land use. The more conservative assumption of water demand for operation 15% of the year would represent a 30 fold increase in water usage which is unsustainable in summer months and during drought conditions.

6.2 The power station needs the water in summer when other demand is highest and supply is lowest. The requirement for water by the power station in the summer coincides with when there is least supply of water and when other water users in the community have the greatest need for water.

6.3 All water options have problems. The EA lists water supply options in Table 4-4 stating that although tankered water is the only guaranteed water supply, Gunning water supply (Lachlan River offtake) and ground water extraction are potential options as a primary water supply source.

6.4 Tankering water will increase traffic impacts on residents. While tankering means that AGL is not taking scarce water from the community or interdependent ecosystems, it will increase traffic impacts. The EA says that up to 40 truck deliveries per day could be required to supply water to the plant (p11-10). However it is not clear if this is an upper limit given that it is

[15] The EA says the land use for the area is sheep for wool and dairy cattle. There haven't been dairy cattle in the region since the 1950s.

assumed the plant will only operates 5% of the year with water demand (other analysis is all based on operating 15% of the year). Traffic impacts need to be carefully assessed to minimise disruption to residents. Forty truck deliveries a day seems more than could be comfortably tolerated.

6.5 Experience of the community indicates groundwater may not be abundant. In relation to ground water extractions the EA states that there is currently an embargo on new applications for ground water licences within the Upper Lachlan Alluvium where the project is sited. The EA goes on to say the current level of extractions is well below sustainable yields, arguing that there is groundwater available for the project. However they also note that studies between 2004 and 2005 have shown a consistent seasonal drop in water levels since 1991 (AGL and URS 2011, p8-4). This accords with comments by the community at the public meeting, that previously reliable bores in the Dalton region have gone dry in recent years and any plans to extract groundwater could impact on water availability to the existing users.

6.6 Reduced approval process for taking water from the community because of Part 3A. The EA says that in 2008 the then Planning Minister declared power generation projects over 250MW to be "critical infrastructure projects" and subject to Part 3A of the EP&A Act. It then goes on to say:

> "Under Section 75U(1) of the EP&A Act, projects approved under Part 3A do not require a water use approval under Section 89, a water management work approval under Section 90 or an activity approval under Section 91 of the *Water Management Act 2000.*
>
> As the proposal does not impact on the river to the north of the site, the licence and approval provisions under the WM Act do not apply."

It is concerning that the approval process for the Dalton power station, in relation to water usage, may be any less rigorous because of Part 3A of the EP&A Act, particularly so given the ESOO 2011 report which says no new electricity capacity will be needed in NSW until 2018/19, in seven years time. The ESOO 2011 report raises serious questions about declaring all power generation projects over 250MW "critical infrastructure".

6.7 How can taking water upstream not impact on the river downstream north or the site? It is also unclear how it is possible to take water upstream, viz. the headwaters of the Lachlan system, and not impact on the river downstream to the north of the site.

6.8 Demands on water resources makes the project conflict with the aims of the Upper Lachlan Shire LEP 2010. The fact that the operation of the power station requires a large amount of water relative to the current use of the land is inconsistent with the aims of Upper Lachlan Shire LEP 2010 to "encourage conservation of natural resources" and "promote the use of rural resources for agriculture and primary production".

6.9 A review of groundwater and Lachlan River water availability needs to take place. A thorough review of groundwater availability, including interviews with local land owners about actual experience with water levels in bores in recent years to confirm theoretical possible water extraction, is necessary before any major extraction of ground water is approved. Also any offtake from the Lachlan River, either directly from the river or indirectly from the Gunning water supply, needs to assess the impact on existing land owners and the fragile Lachlan River environment.

Given the size of the water demand of the project, relative to agricultural use of the land, extraction of groundwater needs to be assessed to ensure yields are sustainable. It will be important that existing users aren't impacted and interdependent ecosystems aren't damaged. The NSW State Groundwater Policy Framework Document (1997) provides objectives for the ecologically sustainable management of the State's groundwater resources and it will be important this project is consistent with those. Also consistency with the objectives of the Water Management Act 2000 will be important (irrespective of any Part 3A exemptions).

7 Air quality impacts during construction and operation

7.1 Increases in dust levels in wool during construction. Concerns were raised by farmers about dust levels from the unsealed roads during construction and the impact that will have on dust levels in their wool clip. This is a real concern given that the report states that there will be 4,600 truck deliveries to the site for Stage 1 (AGL and URS, 2011, p4-32).

Dust levels along with vegetable matter (VM) and grease affect the yield of the wool. A 10% decrease in yield would typically result in a 10% drop in price. If yields drop very low to below 60% then there would be a greater price discount. The best option for all would be to prevent dust by wetting down road surfaces when needed. This will require having a system in place to identify conditions ahead of time when surfaces will need wetting and coordinating water trucks. As farmers have records on yield going back several years, if there is a significant drop in yield because of dust, then compensation should be sought.

7.2 Air quality assessment has been done assuming 35m and 46m stacks and is invalid if shorter stacks are used. The air quality assessment has been done assuming 35m and 46m stacks. However in Chapter 4, it is stated the "height of the exhaust stacks could be up to 46m but likely in the order of 28 to 30m". The plume dispersion modelling will have very different outcomes if shorter stacks are to be used and the impacts on air quality will need to be reassessed.

7.3 The main emissions from the operation of the power station are known carcinogens and cause smog. The main emissions assessed in the EA are nitrogen dioxide, carbon monoxide, sulphur dioxide, particulate matter and formaldehyde. Formaldehyde is a known human carcinogen

while nitrogen oxides (NO_x - NO and NO_2) and sulphur dioxide react in the atmosphere to form smog and acid rain.

7.4 What are the WHO and Australian NO_2 emission standards? Long-term exposure to NO_2 at concentrations above 40– 100 µg/m^3 causes adverse health effects. The 2003 World Health Organisation (WHO) guideline values for NO_2 are a 1-hour level of 200 µg/m^3 and an annual average of 40 µg/m^3 (http://www.euro.who.int/__data/assets/pdf_file/0005/112199/E79097.pdf). The Australian National Environment Protection (Ambient Air Quality) Measure 2003 criteria for NO_2 is higher than the WHO criteria with a 1-hour level of 246 µg/m^3 and an annual average of 62 µg/m^3.

7.5 The standards for NO_2 emission limits should be reduced to take into account summer air temperatures. The submission by Canberrans for Power Station Relocation (CPR) Inc to the Tuggeranong 210MW gas turbine power station states that "The Australian standard for exposure to Nitrogen Dioxide for a maximum of 1-hour per annum was introduced in 1998 and is set in a different unit of measurement –parts per million (ppm). When this limit (0.12ppm) is converted to micrograms per meter cubed at 25 degrees centigrade, this converts to a limit of 225µg/m^3, not 246µg/m^3.". They go on to say if you take into account maximum summer time temperatures of 40 degrees centigrade, the National air quality standard is reduced to 214µg/m^3. They also say the WHO standard would be lowered when taking into account summer temperatures. http://canberrapowerstation.info/ftp/CPR-ACTPLA-Submission-27-5-08%20Final.pdf

7.6 The Dalton power station NO_2 emissions exceed the WHO standards and the temperature adjusted Australian standards. The proposed Dalton plant has a maximum cumulative 1 hour level of 240.7 µg/m^3 NO_2, and an annual level of 37.4 µg/m^3. This 1 hour level significantly breaches the temperature-adjusted Australian standard as well as the level the WHO considers safe for human health. The annual level is only just below the WHO standard to prevent adverse health effects. Also the manufacturer says for the turbines GE 9FA, NOx emissions exceed 25 ppmbv.[16] AGL says all manufacturers guarantee emissions of 25 ppm when operating at over 50% load (AGL and URS 2011, p3-62).

7.7 Technologies are available to reduce NOx emissions but rejected as too costly. A number of possible options for controlling NOx emissions are examined by AGL with the most effective being Selective Catalytic Reduction (SCR) (AGL and URS, 2011, p3-61). AGL state that the SCR process has the problem of causing exhaust emissions of ammonia and potential for accidental release of ammonia at a site adjacent to the Lachlan River. (It is hoped AGL have the competence to prevent the accidental release of any and all harmful chemicals stored on site). They also state that the process could cost up to $50,000 per tonne of NOx removed, whereas they are able to pay the NSW Government a load based licensing fee of $220 per tonne of NOx emitted.

[16] http://www.china-power-contractor.cn/GE-9FA-255mw-Gas-Turbine-Generator.html

An independent assessment needs to be made concerning the costs and benefits of technology options for controlling NOx emissions. Community residents are concerned that technologies that are available aren't being implemented to control NOx emissions, especially with emissions exceeding WHO guidelines.

Residents neighbouring existing gas fired power stations in NSW haven't raised air quality as a problem, but the proposed Dalton power station is unprecedented in its size and the region is subject to a very high frequency of stable meteorological conditions.

The community does not want Dalton to be an air pollution zone.

7.8 Have residents in the peak impact area been told about the exposure to emissions from the power station? The peak impact area is predicted to be 10km from the plant. The EA report has been written to suggest this is a good thing – that the community of Dalton won't be exposed to the worst of the emissions. It may be a relief for the people of Dalton but it will be of serious concern to the people south south-west of the site. Has AGL as part of their consultation process contacted affected land owners in this area to tell them their exposure to NO_2 emissions will exceed WHO safety standards?

7.9 Incorrect peak impact area stated. The report says the peak impact area is 10km south south-west of the plant. However this is not correct. Appendix C states "The peak impact area was predicted to occur 10km south south-west of the Facility, as shown in the Figure 9." But Figure 9 isn't included in the report. In Figure 8 of Appendix C, the iso-contours show a concentration of pollutants west south-west as well as south of the site, near the town of Dalton.

7.10 Incorrect stability class identified for the site. The stability classes for the site are reported in Table A-2 of Appendix A to Appendix C. It is stated that "Table A-2 shows moderately stable atmospheric conditions (Stability Class D) is the most prevalent Stability Class of the area". This is incorrect as the table shows moderately stable atmospheric conditions (Stability Class F) to be the most prevalent Stability Class of the area, occurring with a frequency of 39.2%. Stability Class D (neutral) occurs 20.2% of the time. The assumption of a less stable atmosphere will seriously underestimate the air quality impacts in any modelling.

8 Site night lighting impacts and sun glare from chimney stacks

8.1 An assessment of proposed night lighting needs to be done to prevent adverse impacts. Uranquinty residents say that night lighting of the power station and sun glare from the chimney stacks has impacted negatively on them. AGL have stated that endangered owls in the Dalton area mean that they will face lighting downward and so night lighting won't be a problem for the Dalton community. Given that other communities have had problems with night lighting, the environmental assessment needs to review the night lighting proposal to minimise adverse impacts.

8.2 A review of the effectiveness of non-reflective material to prevent sun glare needs to be undertaken. AGL say non-reflective material will be used to construct the chimney stacks. This was also claimed in the construction of the Uranquinty power station. The initial non reflective material used at Uranquinty didn't prevent sun glare and had to be replaced. AGL needs to review other industry experience to ensure materials used at Dalton will prevent adverse sun glare impacts on the community.

9. Exaggeration of job benefits to the region

AGL have said the project will provide job opportunities for the community. The reality is however that AGL will tender for a company to construction the power station and there is no guarantee that jobs will go to locals. The tender will most likely be won by a company located outside the Dalton area, with expertise in building open cycle gas fired power stations.

When the plant is operating, it is largely unmanned (with 5 to 10 employees) and controlled remotely. It is unlikely that local residents will have the specific skill sets required to find employment at the power station when it is operating.

10. Conclusion

On the basis of the review of the environmental assessment it is concluded that the proposal to build a 1500MW power station at Dalton be opposed. The proposed Dalton power station would be the biggest gas fired power station in Australia. It is equivalent to two Uranquinty power stations being built on the one site. The cumulative negative impacts are too great for one community to bear. Furthermore there is no need for the project for the reliability of electricity supply in NSW for seven years.

The environmental assessment is fundamentally flawed in a number of critical areas which means there is an unacceptable level of risk with the project. The noise assessment cannot be relied upon as no noise data was available for the F class turbine stacks, so a value that wouldn't exceed noise limits was assumed. This lacks scientific rigour. By assumption the noise limits aren't exceeded.

The Uranquinty case, along with Alice Springs and Laverton cases, point to problems of engineering expectations of noise levels not according with real world outcomes. As the technology proposed hasn't operated in Australia, empirical data internationally needs to be sourced and impacts on the community need to be assessed under adverse weather conditions. There are additional risks at Dalton because temperature inversions cause stable meteorological conditions and worsen noise and air quality impacts.

Water is also a problem. Water is required by the power station in the summer when supplies are lowest and existing user demand is highest.

Dalton is a peaceful rural area. When asked by AGL what one resident could currently hear on his rural property, the local replied “I just hear the birds”. The community wants this tranquillity preserved.

Appendix A:

Appendix A contains details of the families at Uranquinty who have been seriously impacted by noise in excess of NSW INP guidelines. Of the families:

- 5 have been bought out by Origin and left the area (see Figure A-1 below)- Wyrilla & The Pines were 4th generation families;
- 2 have taken compensation payments for the next 5 years with the option to be bought out if the noise levels cannot be mitigated;
- 2 are currently in negotiations with Origin.

Residents at Uranquinty say that initially engineers installed “prongs” into the top of the stacks to reduce the ‘rumbling’ but have now created low frequency noise and vibration problems. Origin has had engineers from Germany and Canada on site trying to find a solution and is looking at rebuilding the stack configuration at a cost of $60 million.

In Figure A-2 the circle with a 2.5km radius shows the location of residents relative to the Uranquinty power station.

Appendix A: **Figure A-1**

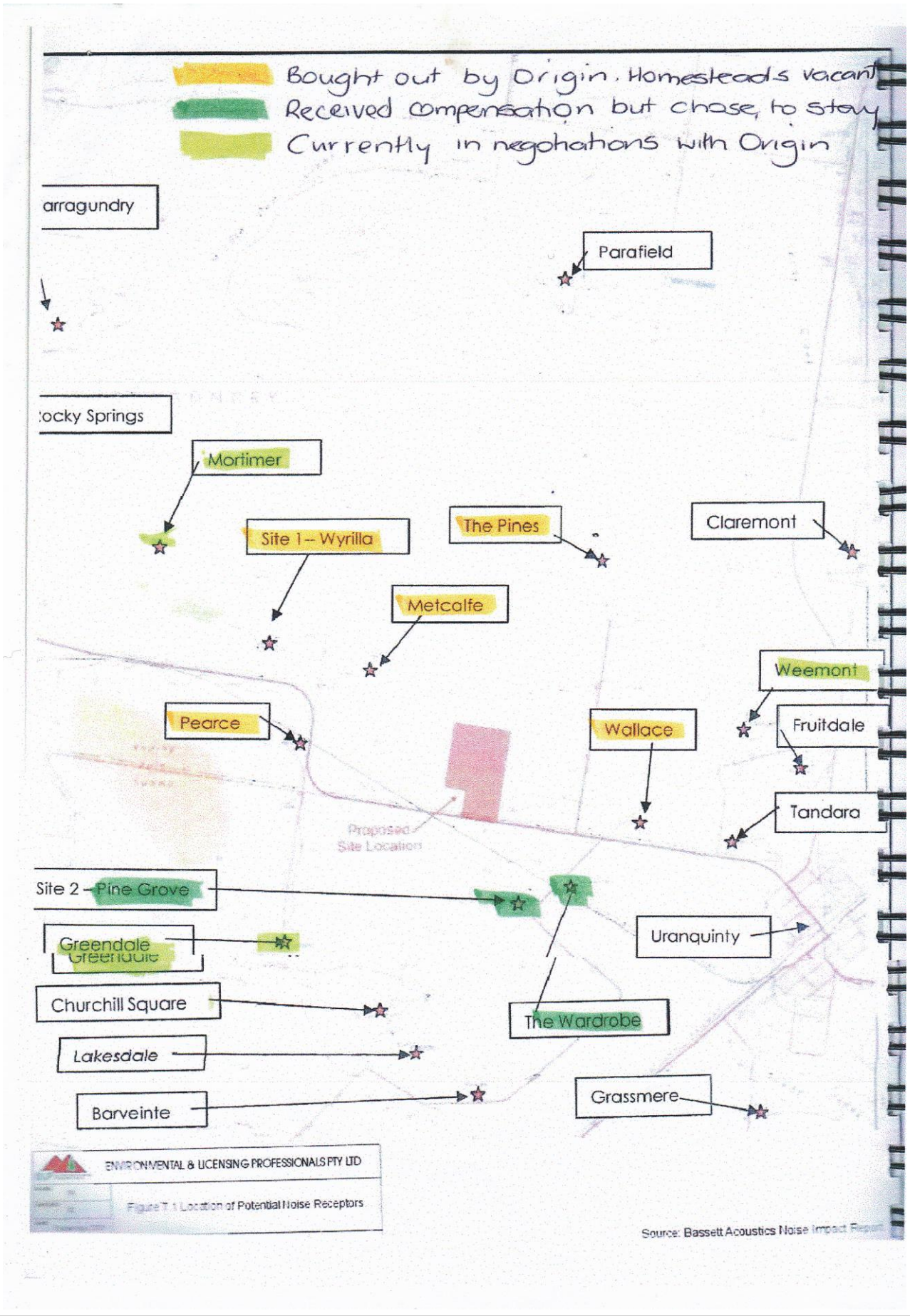
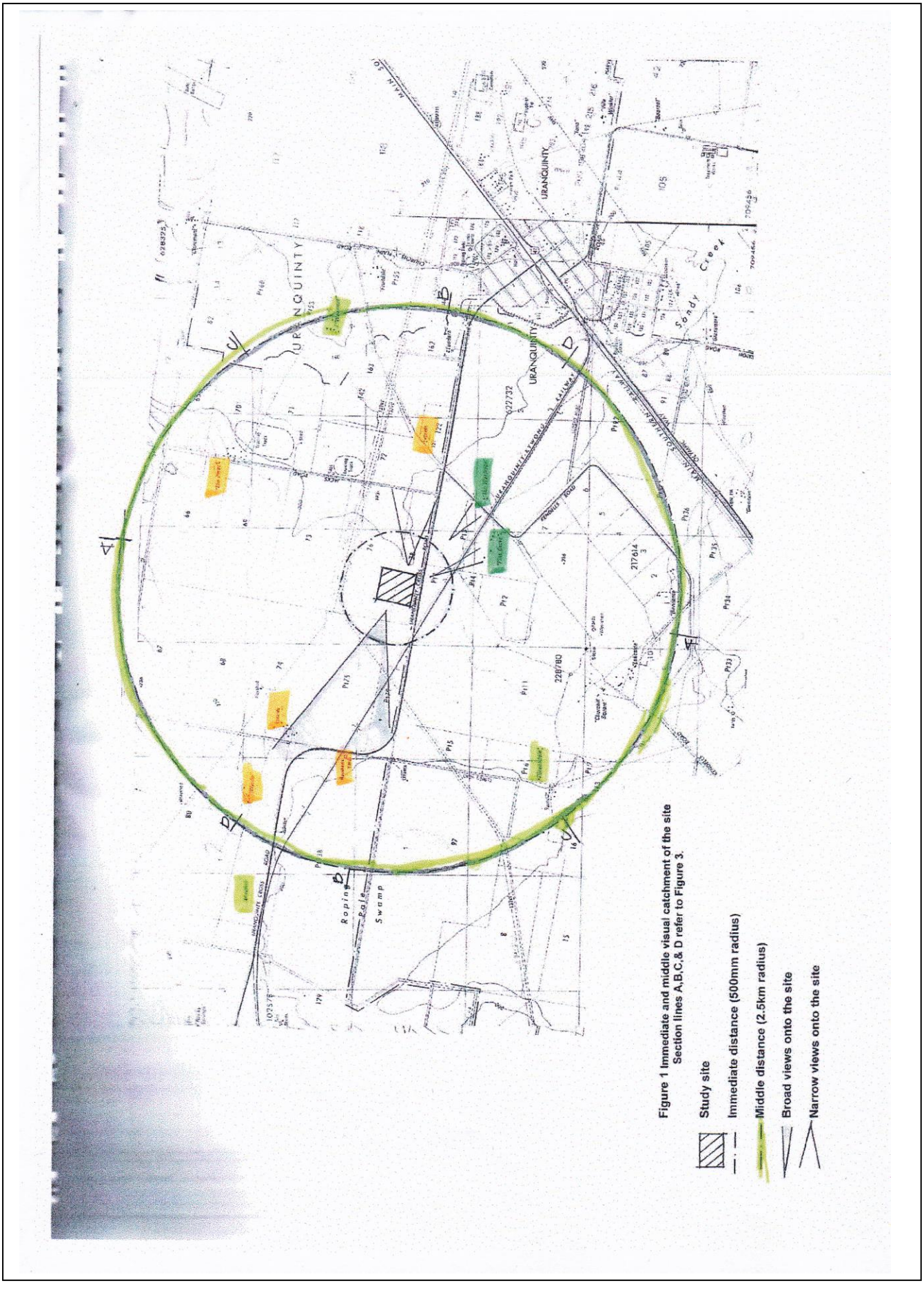
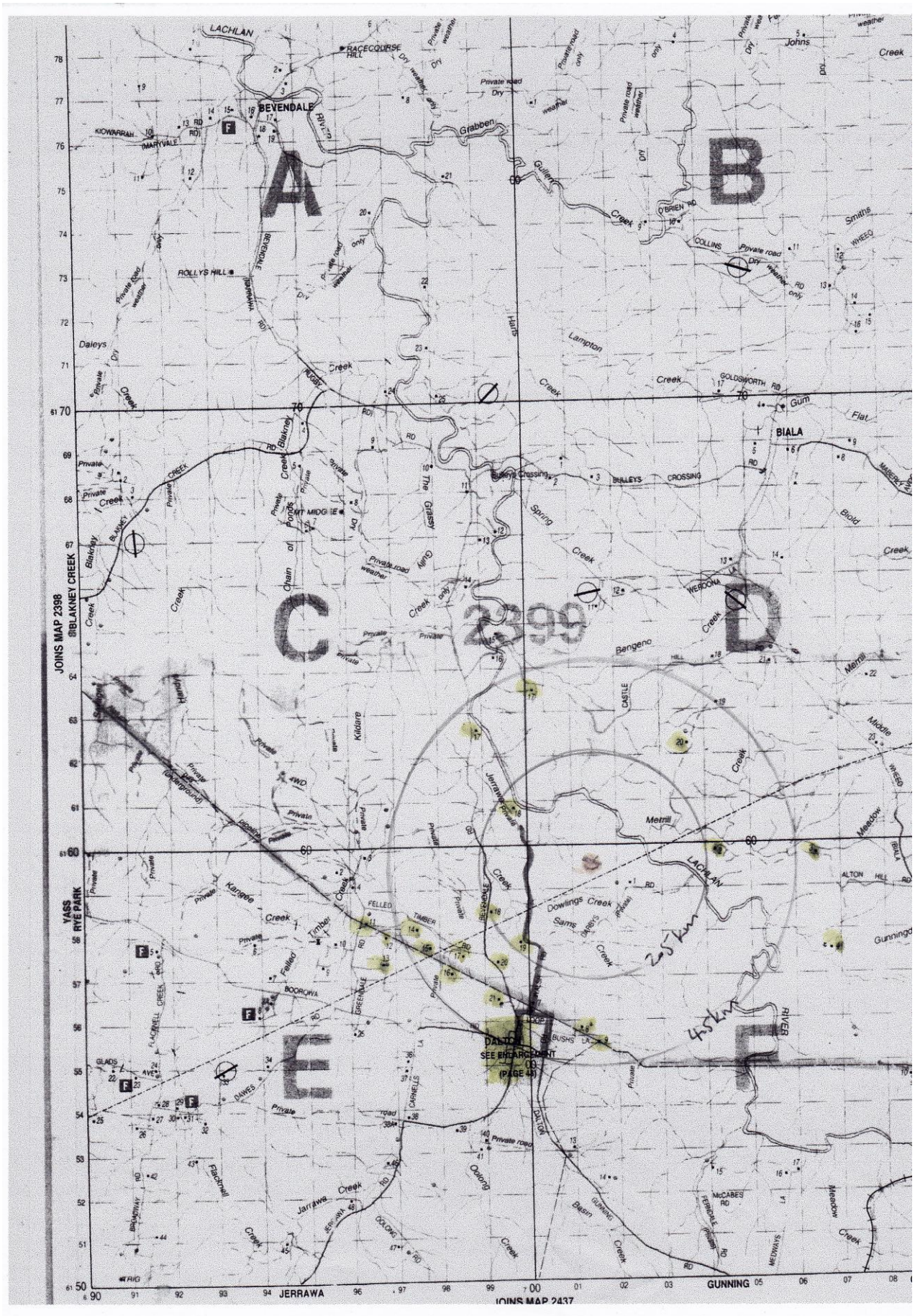


Figure A-2: Radius of 2.5km from the Uranquinty power station and the location of dwellings

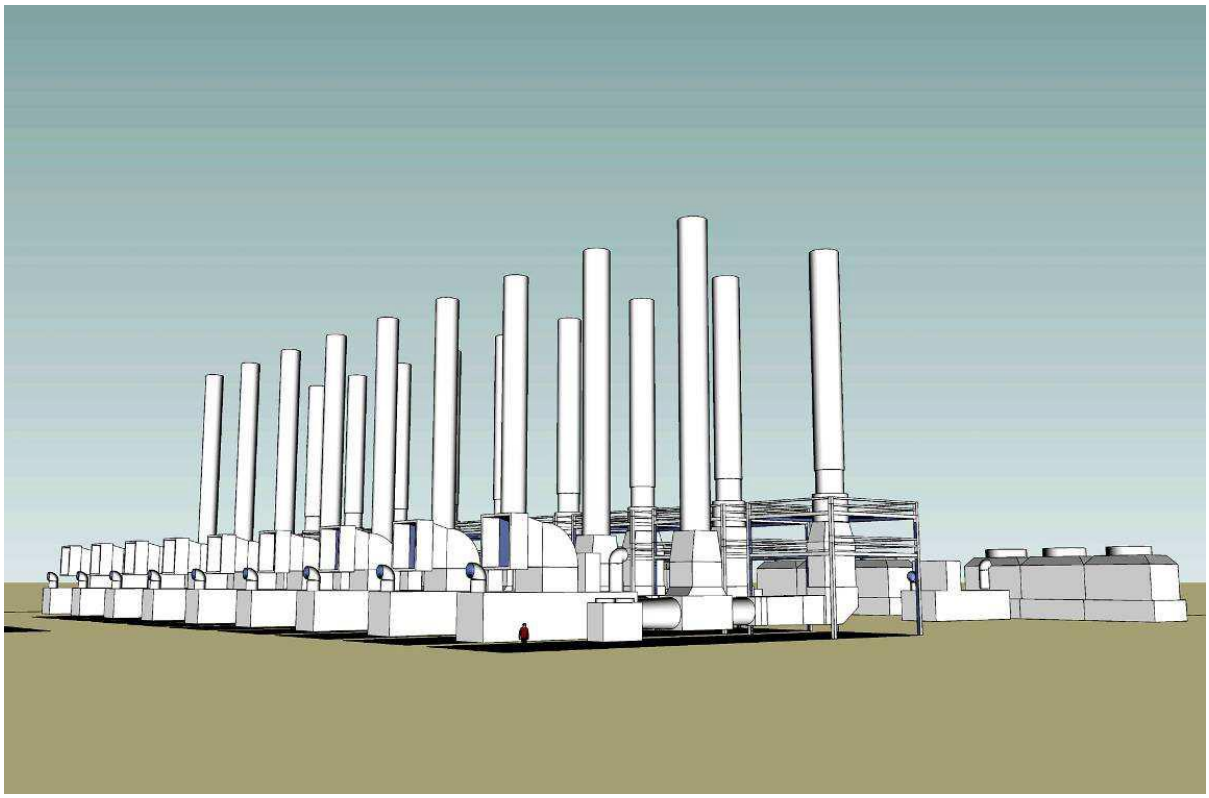


Appendix B: **Figure B-1: Radius of 2.5km and 4.5lm from the proposed Dalton power station (highlighted in orange) and the location of dwelling in the Dalton area (shown as highlighted in yellow)**



Appendix C:

210MW GAS TURBINE POWER STATION AND DATA STORAGE CENTRE, TUGGERANONG



Scaled Illustration of proposed power station, (note the 6ft person standing in front of the first generator).

The stack heights in the submitted plan for Tuggeranong were 35m. The proposed height at Dalton is 35m for Stage 1 and 46m for Stage 2.