Media Release: Kingaroy Concerned Citizens Group
22nd September, 2016.

Kingaroy Asks for Coal Permit "Buy-Back"

Kingaroy residents concerned about the health impacts from a proposed coal mine near their town are demanding the Queensland Government buys back the exploration permit from the company proposing the mine.

Moreton Resources (previously known as Cougar energy) is proposing to begin development of the open cut coal mine in 2017 just 4 kilometres south of Kingaroy.

A large number of people in the town have expressed their disapproval of the mine. They believe it will be located on some excellent agricultural land, will also have arsenic in tailings upstream from the town water supply, and will be located in a position that ensures coal dust will be prevalent in the town areas.

The request for the Queensland Government to buy-back the Exploration Permit EPC 882 comes about after the recently released study by Dr Rock Boothroyd about the probable health effects of the mine. Kingaroy residents also note the example set by the New South Wales Government[1] which recently bought back a coal exploration permit near Tamworth.

"A recall of the permit is one of the simplest ways for the Government to save the company from completing an expensive Environmental Impact Statement and also save the local community from further concern." said John Dalton, spokesperson for the Kingaroy Concerned Citizens Group (KCCG).

"The local community and our local Parliamentarians can see it's a poor proposal, and Dr Boothroyd's study validates our concerns, so there is a strategic opportunity for the Minister Lynham to exercise his powers to intervene for the benefit of the local community, the company, and its shareholders." Mr Dalton added.

The group is yet to receive a response from the minister.

John Dalton (Spokesperson Kingaroy Concerned Citizens Group)
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[1] http://www.abc.net.au/news/2016-08-11/nsw-government-buyback-caroona-mine-exploration-licence/7721936

Hon Dr Anthony Lynham MP
PO Box 15216
CITY EAST QLD 4002

5th September 2016

RE: AUTHORITY OF THE QLD GOVERNMENT TO BUY BACK EXPLORATION PERMIT FOR COAL (EPC) 882

Dear Minister

Thank you for your response to our letter of 24th August 2016 in relation to the proposed development of a coal mine near Kingaroy by Moreton Resources Limited.

In light of the recent handling of similar applications by the New South Wales Government[1], the Kingaroy Concerned Citizens Group (KCCG) respectfully requests the Queensland Government buys back the Exploration Permit EPC 882 from Moreton Resources Limited, if such an option exists under the Mineral Resources Act, or other relevant legislation.

The granting of this request is crucial to public health in the Kingaroy community based on the following:

- KCCG commissioned a detailed, independent scientific study by Dr Rock Boothroyd (attached as Appendix 1);
- Dr Boothroyd's paper exposes the **extreme public health threat of destabilised arsenic on a mine site just upstream from the Kingaroy water supply** at Gordonbrook Dam;
- The Queensland Government has previously approved releases of mine water during flood events which involved calculated risks ameliorated by the dilution in an extended river system. Such dilution would not be possible in the case of the proposed Kingaroy mine as it is to be located on a small creek with local inflow to the town water supply and dilution sufficient to satisfy a reasonable risk assessment would not be possible;
- This public health threat is further compounded by the prospect of an accidental release of mine due to technical failure (as happened in the Hunter Valley in January 2016[2]), and seepage into extensively used local groundwater aquifers;
- **Our information is that the neither Queensland Government nor the South Burnett Regional Council has sufficient technical capacity to manage or rehabilitate a critical incident such as a mine volume of arsenic contaminating the Kingaroy town water supply.**

[1] http://www.abc.net.au/news/2016-08-11/nsw-government-buyback-caroona-mine-exploration-licence/7721936

[2] http://www.worldcoal.com/mining/18012016/Wambo-coal-mine-reports-dam-breach-2016-61/

- Dr Boothroyds paper also articulates the **serious public health risk posed by frequent exposure to coal dust from a mine so close to town** (poly-aromatic hydrocarbons in coal dust is the same carcinogenic material found in cigarette smoke; the health effects of elevated exposure to coal dust are well documented by peer reviewed scientific studies).

With the above factors in mind, KCCG is confident that its objection to the mine is both justified and likely to be sustained.

In a manner similar that currently occurring in Acland involving the Qld government, New Hope Coal, and the local affected community, we anticipate that processing this mining application will be characterised by a litany of conflict and protest.

We are therefore asking that you describe the legislative options available to the Queensland Government with respect to buying back EPC882 from Moreton Resources Limited ($300,000 purchase price from Cockatoo Coal in 2015).

The New South Wales Government has shown it can be done, setting an example that Queensland should not ignore.

We would welcome the opportunity to speak to these issues, either personally, or by a phone conference.

On behalf of the concerned citizens of Kingaroy,

Yours faithfully

John Dalton
(Spokesperson for KCCG)
0408 236 558

Cc: Ms Deb Frecklington MP
Mr David Littleproud MP
Mr Keith Campbell (Mayor)

Commercial- in-Confidence

Review of the consequences of proposed open-cut coal mining in the vicinity of Kingaroy

R. G. Boothroyd, M.A., M.Sc., Ph.D., C.Eng., F.I.Mech.E.

Submitted to KCCG 2nd August 2016

N. B. This report is claimed to be "client-privileged" advice for the Management Committee of Kingaroy Concerned Citizens Group (KCCG). Nevertheless in the event of authorisation of this mine, the Author has a clear professional responsibility to forward this report to the National Residue Survey in Canberra, unless this responsibility is taken up by the Queensland State or Federal Governments. The subject and costs of any necessary routine testing of crops and livestock would then arise.

1 Introduction

This report is not concerned specifically with coal mining in general but only with the consequences of open-cut coal mining as proposed by Moreton Resources [1] in the close vicinity of Kingaroy.

2 Contamination of the vicinity with inorganic pollutants

This project [1] is large compared with its sensitive vicinity. It is planned to excavate 7 x 10^6 tonnes of raw coal annually over a 40 year period. On page 17, table 2 of ref [2] it is reported that the coal in the nearby Meandu mine contains up to 10 mg/kg of Arsenic. Thus over the proposed Kingaroy mine's lifetime it seems that 2800 tonnes of Arsenic will also be mined. Most of this would be retained in the coal to be sold but clearly it is intended to dump waste which could contain as much as 480 tonnes of arsenic as backfill on the mining site. This is an upper limit estimate based on the precautionary principle. It seems reasonable to conclude that this would seriously contaminate the groundwater of Kingaroy which leads to the Stuart River and Kingaroy's water supply.

Raising pollutants from underground (where they are secure and innocuous) to the surface where they are harmful is a fundamental problem in mining. This example indicates the folly of proposing a mining project which is so close to sensitive areas. Arsenic is the most common of the dangerous heavy metals to be found in coal seams. There are about 25 other relevant potentially toxic inorganic elements in coal which must also be considered. The present writer has not yet managed to download expected further detail in ref [3] which is reported to be on open access at the National Library in Canberra.

Page 6 in ref [1] illustrates just one of the pits where the Arsenious waste will be dumped where it can be expected to leach into groundwater when we have heavy rain. The statement on page 11, of ref [1] claims that there is no need for a tailings dam. Yet this is precisely what these disposal points are except that they would not even be properly designed dams. This indicates the ill-considered nature of the proposal [1]. Even a well-designed tailings dam for so much Arsenic would seem to be a reckless proposal so close to Kingaroy. This problem seems sufficient in itself to disallow the project.

3 Contamination of the vicinity with organic chemicals

Up to 75% of the carbon in coal is in aromatic form [4]. Mostly these 500 or so chemicals comprise a very large number of polycyclic aromatic hydrocarbons (PAHs). These PAHs largely consist of chemicals with large molecules i.e. 6 interconnected benzene rings in each molecule. There are a lesser number with 5 rings in coals. It is these larger molecules which often have the most toxic effects. These chemicals occur naturally but at low levels in the environment. At the low concentrations which are natural, animal life has adapted to their toxic qualities to survive as a species. Although some PAHs are relatively harmless, at higher concentrations, there are still a large number of important PAHs which are carcinogenic or can affect DNA and cause significant birth defects. A PAH can change to another chemical due to environmental effects. PAHs also metabolise into other chemicals in the bodies of animals. Eventually PAHs will all decay away by various natural processes. However this process is far too slow to be of any use in controlling the emissions from the open-cut coal mine in question [5-17].

It is difficult to identify these many individual PAHs in a coal sample which is usually described in terms of a smaller number of 'macerals'. A large single piece of coal is harmless enough because these unpleasant chemicals are safely "immobilised" inside the coal structure. Breaking the coal will mobilise a portion of the PAHs and further fracturing of the coal releases still more PAHs. If the coal is burnt at a sufficiently high temperature using appropriate technology and with an ample supply of air, the PAHs are completely destroyed and the combustion products are reasonably safe. As is well known, high temperature incineration of our most dangerous organic chemical by-products is often the best way for their safe disposal.

The problem is that when coal is fractured in open-cut mining some PAHs are "mobilized" and these large PAH molecules tend to attach themselves strongly to the small dust particles which are produced at the same time. The dust particles can then be ingested mainly into our lungs or the alimentary canal where the toxic PAH chemicals become a health hazard [18]. This effect has to be considered in any industrial process which increases the local PAH concentration abnormally. An open-cut coal mine situated close to where people live is certainly one such example.

Cigarette smoking is also an ideal way to generate PAHs, and although some heavy smokers can live to a good age, many more will develop lung cancer at a premature age. Individuals vary considerably in their ability to resist toxic chemicals but, when considering a large population, dose of toxins correlates well with the statistics of early mortality. Smoking tobacco in public places is usually banned for these reasons because it produces an incremental increase in health hazard to the general community.

3.1 The dust problem

Open-cut mining inevitably produces large quantities of dust and this is not easy to control, especially in a hot dry climate where water-spraying is of limited value. Published data are variable. Some say that 40% of dust is caused by heavy vehicles. Other publications quote a lesser figure. Blasting is also relevant and hard to optimise. For example “still” atmospheric conditions will restrain the dispersal of dust and its adhering PAH contaminants to give a high local reading of contamination but the most dangerous (less than PM10 (10 micron)) dust will inevitably disperse widely. Using windy conditions may give lower measurements but the contamination is merely dispersed to affect more people.

Inevitably PAH-contaminated dust will enter homes and affect food thus increasing the risk of colon cancers [18,19]. The dust will also contaminate carpets and other soft furnishings to increase the background level of chemical contaminants. Several studies of residential PAH contamination of carpets have identified this as a problem area. For example a recent study [19], related to childhood leukaemia, measured (using gas chromatography/mass spectrometry) 12 dangerous PAHs ranging from 10-190 ng/g at dust median concentrations. Ref [19] quotes many useful earlier references. If vacuum cleaners are used too frequently in a home this would worsen the problem by making the smaller particles airborne to enter the respiratory tract where they are likely to stay. Many domestic vacuum cleaners claim to have HEPA filters but these rarely conform to true HEPA specifications. Anyway they soon clog up and are often removed by a well-meaning husband who could then be far safer at his place of work than his wife who is meanwhile attempting to keep the house clean.

In the Kingaroy area many homes collect rainwater from roofs which are also ideal for collecting coal dust. Roof-water is popular because the porous nature of local soils makes well-water hard to collect. Using imported spring water from the supermarket for drinking and cooking will not eliminate this problem because PAHs can pass through human skin so that personal hygiene may also become harmful.

3.2 Problems with local agriculture and grazing where PAHs and other contaminants are produced.

Many residents of Kingaroy are retirees and, at present, this area has many attractions for persons approaching retirement. Real estate values are reasonably high but attractive compared with higher inner city prices. Many younger residents in the general area of Kingaroy also rely on agriculture for a living. Originally this area was rain-forest country, although in drought, which is quite commonplace, it was prone to bush fires. One of the advantages of sustainable agriculture is the balance it creates by breaking up the land into areas where bush-fires are easily contained. Areas with good volcanic soil are used for a variety of crops. Less fertile soils are used extensively for grazing, mainly beef cattle. A large open-cut coal mine in the near vicinity places all this agricultural activity in jeopardy.

The main problem is contamination from dust covered in section (3.1). Both crops and animals can become contaminated by dust which is carrying toxic chemicals. Animals sold for food are subject to monitoring for chemical residues and at present we have a good record for compliance with regulations. The subject of food contamination at the agricultural stage is one which is well-covered in the scientific

literature [20-21]. This scientific certainty contrasts with the lack of scientific data in some other areas in this review.

Cattle on land contaminated with organochlorines can trigger tests after a mere 2 hours of grazing. The same effects can be expected with the PAH contaminants arising from coal-mining dust. Over a longer period of time these contaminants enter the soil [20]. Animals usually concentrate the toxins in their diet into their own tissues. In addition to the Arsenic case considered above there are about 25 inorganic chemicals in coal dust which are potentially hazardous. Selenium and Cadmium [21] are common examples. Industrial accidents happen even under the best and well-supervised conditions. A coal mine cannot be expected to function ideally all the time because of its size and nature. A relatively small industrial accident with a defective filter unit [22] affected and killed 35 of 120 cattle from heavy metal poisoning.

However the problem is not so much with causing death of animals but the much greater chance of producing contaminated food products much further down the line of production. It is easy for such mishaps to escape detection. The preservation of Australia's reputation for wholesome food products is of paramount concern to food producers and state and federal governments.

4 Epidemiological evidence for the health hazards of open-cut coal mining

Open-cut coal mining is prevalent in Virginia, U.S.A., and numerous papers have reported the adverse health effects on residents nearby. Research carried out in Chinese coal fields [7, 9,14, 15, 16] comes to similar conclusions. Mostly these papers are well-researched scholarly works from prestigious universities and are published in peer-reviewed journals [23-29]. They use statistical analysis to exclude other covariant effects on health such as smoking, obesity, low income and poor education.

The evidence from this extensive literature is irrefutable and leads to the conclusion that long term exposure to coal-dust is injurious to human health. Somewhat surprisingly this evidence is not limited to lung, colorectal and skin cancers (discussed in section 3) but also extends to cardiovascular disease and some other ailments. It is important to draw a distinction between occasional exposure to PAHs and the much more hazardous situation of continuous exposure. Because low levels of PAHs have always existed, through evolution animals have adapted to occasional exposure by excreting these toxins in urine and faeces. However, they have not adapted, and cannot adapt, except by massive mortality rates over aeons, to artificial and unnatural continuous exposure.

These overseas studies also reveal the increase in live birth defects from coal-dust contamination [30, 31] which would be expected from the mutagenic effects of some PAHs.

Popular publications such as [32] are easier to read and the maps of affected areas in this particular publication illustrate the problem. However a more critical reading of popular reports is required. For example, any suspicion that mountain top removal contributes significantly to the problem is open to question. The same pollution effects [33] are found in coal-mining areas in Illinois which is very flat land.

Despite the extensive literature now available, it serves only to demonstrate the dangers in open-cut coal mining. Almost all of this literature concurs with the general opinion that more research is needed to understand the detailed mechanisms of damage to human health. This is a very complicated subject.

5 Anticipated problems with designing and approving an adequate EIS submission

The existing permit [34] for the Meandu mine for the Tarong power stations mine specifies maximum permissible dust levels in physical terms only. Yet this permit seems to have been sufficient as a public safety safeguard. Another problem is the public concern with coal dust fugitive emissions from coal trains summarised in Appendix I. These dangers have been mitigated mainly by using veneering. No comparable solution is known to the present author whereby an open cut coal mine can be operated safely near human habitation.

Because the proposed Moreton project is very close to sensitive areas, it seems inevitable that medical routine tests of a statistically-relevant number of human residents would be necessary as an ongoing routine. This would probably involve urine/blood tests for chemical contamination and this is a complicated and expensive procedure. This is in addition to routine tests for animals/crops considered above. These considerations require a much more stringent EIS submission and approval permit which includes chemical criteria related to dust levels. This also requires a very close attention to the engineering design details of the project.

Many established methods are useful for design [35-37] but severe deficiencies in the literature cited below, make the design of the mine so uncertain in its effects as to require continuous monitoring of undesirable health effects while it is operating.

In conclusion it is also difficult to see how approval for this project can be given without contingency criteria which may even result in the mine having to be abandoned at an early stage if remedial measures applied later are found to fail. This is hardly a reasonable requirement in a project stated as needing an investment of about $250 million [1].

The writer has examined a number of remedial actions to make the project conform to safe practice. However these were not encouraging and appear to have limited and uncertain value. These included strict control of blasting; cessation of operations in bad climate conditions and bitumen sealing of all local gravel roads to reduce contaminated dust dispersal.

6 The expected alternative ability of the Project's proposers to address problems in sections 2 -5.

Australia has such large alternative coal resources that the competitiveness of MDL385 and EPC882 can be called into question. Problems of extreme proximity to sensitive areas are not encountered in most other developments. Similar environmental effects take place but they do less obvious harm than would be the case in the Kingaroy project.

The possibility of using these coal resources for CSG has been examined, as an alternative, because CSG has a much weaker mobilising effect for PAHs [38] than that experienced in an open-cut coal mine. This is because 'fraccing' is a much less severe form of coal fragmentation. However problems with produced water disposal seem prohibitive in this suggestion, especially if the produced water is found to be contaminated with heavy metals such as Arsenic. Also the nearest CSG pipe network hub is at Dalby or Chinchilla and no local alternative market is available for the gas. An underground mine may seem to be another alternative possibility enabling much better control of PAHs to be achieved using air-venting filtration [39] but this does not seem to make economic sense in an overall plan.

After considering the matter [40-41] it seems that these resources at MDL385/EPC882 are of relatively minor commercial value in today's world.

7 Conclusions

The evidence is very strong that this project is far too close to Kingaroy and its surrounding and productive agricultural land. In the event that this project approaches the approval stage, local residents are advised to take steps to safeguard their legitimate interests. This includes legal and further scientific advice concerning the use of compensating class actions for damage to health; loss of property values and loss of income. This includes damage to agricultural land and its products. This responsibility should also be examined with regard to the liability of any official body involved with authorisation of the project.

Ref [1] and any subsequent documentation should be re-evaluated in financial terms which accommodate these risks. This should include a very sizeable bond-deposit to accommodate these risks.

In support of these conclusions Kammen [42] has stated that: 'Ahern of Washington State University said 'regular exposure to coal dust is extremely dangerous'. In addition to what she said, Kammen "pegs the cost of carbon emissions and human health at US$21/tonne of coal". This puts the anticipated revenue resulting from selling coal at AU$50/tonne from [1] into its true perspective. Thus in fundamental terms of true costs the project does not appear to be viable.

Ahern and her co-workers, using the data from the extensive open cut coal mining in Virginia confirms the conclusions in the present review. She states that "As coal has moved from underground to the surface, the mining gets dirtier ….. more environmental effects and more effects on human health" [42].

In conclusion Moreton's project plans $11 billion in sales and prima facie this may look attractive until one looks at Kammen's [42] estimate of the cost of damage including that to health, property and income of residents in the South Burnett. Ill health may take years to develop, but in just a few years it is reasonable to expect statistics similar to those experienced in Appalachia. There are about 40 years of mine life available for litigation for damages to proceed. Are Moreton Resources truly aware of the difficulties they will encounter? It seems that this grim future is one which is best avoided.

8 Recommendation

The evidence based on the close proximity of the mine to sensitive areas suggests only one reasonable course of action.

It is recommended that: Moreton's Kingaroy Project Proposal should be rejected outright.

References and explanatory notes

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[44] The BTEX chemicals are unlikely to be important [fd] in Moreton's new project [mv1] because due to their volatility they will disperse rapidly in the atmosphere. Rainfall is rare enough in the South Burnett to limit the transfer of these chemicals to groundwater to negligeable proportions. Also this area near Kingaroy would be expected to have a much lower background of BTEX contamination compared with urban areas. This would limit the chance for BTEX measurements to trigger the need for attention [45,46].

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[48]] Wright, W. & Hearps, P., (lead authors) et al., Zero Carbon Australia Stationary Energy Plan, (2nd Edn) University of Melbourne Energy Research Institute: Australia,pp. 1-171, 2011.

[49]] Boothroyd, R. G., A suggested roadmap for world-wide energy resource planning and management, International Journal of Energy Management and Production, 1, pp.72-86, 2016.

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APPENDIX I: Eliminating fugitive dust emission problems from coal trains

Suburban residents in Newcastle have long been aware of the health dangers of coal dust of size PM_{10} and lower. They monitored these dust levels with their own equipment installed next to railway lines conveying coal trains. This problem now seems to have been resolved in both NSW and Qld by cleaning and levelling procedures and sealing the upper surface of coal in the wagon. This is called 'veneering' and involves spraying the coal with a bio-degradable polymer which prevents wind erosion of the coal particles. This technology is outside the present writer's own experience but a 'theoretical' calculation indicates that a dangerous $PH_{2.5}$ particle is bound to the veneering polymer with a force which is at least 20 times as effective as the force holding a larger 50 micron coal dust particle. The latter particle is classified more as a nuisance rather than a health hazard and it is not a serious matter if some of these larger particles are lost. All this indicates that the technology is a success and loss of coal from rail wagons seems to be restricted to less than 10 m from the rail track.

Another important feature of veneering is that it is carried out often several hundred kilometres away from the sensitive areas through which the train passes. The hazardous $PM_{2.5}$ particles can travel many kilometres even in gentle winds if this veneering procedure is not used. Unfortunately no similar technology is available for coping with the dust problem from open-cut coal mines.

APPENDIX II: A brief history of Moreton Resources and its Kingaroy interests.

Moreton Resources, formerly known as Cougar Energy, was the least experienced of three companies allowed to trial underground coal gasification (UCG). Cougar's trial was terminated at an early stage due to release of benzene [43-45] from an underground explosion. The present writer was overseas at a scientific conference when the mishap occurred, but, from data received afterwards, it seems that the contamination was very small as only about 40 cubic metres of coal had been consumed at this early stage.. There is little doubt that Kingaroy had a lucky escape as the largest and best resourced of these 3 companies, (Linc Energy) continued its work for much longer resulting in a huge contamination of land near Chinchilla. As this is before the Courts and *sub judice,* further comment is limited. There is little doubt that Kingaroy by now would have also become devastated, like the site near Chinchilla, had it not been for the 'fortunate' early gas explosion which terminated the work near Kingaroy at this early stage. After the nuclear disaster at Chernobyl, one would have expected that we would all have learned that secure containment of a dangerous industrial process is always a vital necessity.

The people of Kingaroy have every reason to demand safety and other basic rights and mostly they are not opposed to industrial development such as at Stanwell's Tarong Power Stations. The present writer has been nominated by KCCG as their representative at Stanwell's public meetings and, likewise, Stanwell also has its own representative on the KCCG management committee. The present writer can vouch for Stanwell as a good industrial neighbour. It is a well-equipped and well-staffed organisation. Above all it strives for the highest standards in public safety and the welfare of its own staff.

There is a huge difference between Stanwell and Moreton with regard to size and resources. This difference probably accounts for some of the lack of public support for Moreton's proposal.

Appendix III <u>The changing relevance of the Coal Industry in Australia's economic future</u>

There is no doubt that owners of coal development permits are anxious to advance their interests as soon as possible because climate warming is becoming increasingly apparent. This is a worldwide problem which also seems to cause the rejection/postponement of much new/better technology and visionary development. Prime Minister Turnbull seemed to recognise this when he said recently that we need a more diversified Australian economy .

Making Australia into a 'quarry for the world' may give employment for heavy machinery but it does little for employment of people. Only 8% of us are now employed in manufacturing which puts us on a par with Estonia or Portugal [47]. Modern automated production techniques can make productivity of Australian workers more competitive compared with other workers in lower personal income countries. This is because high-tech automated production work demands good education, skill and adaptability. The days of workers patiently carrying out tedious manual repetitive jobs are fast disappearing even in developing nations. The potential often exists for two such skilled Australians to share the same job, with both enjoying a liveable wage comparable to today's remuneration. Unemployment is one of today's worst social problems and it has to be tackled rationally and –no pun intended- this may include job rationing and sharing.

Solar power is becoming more competitive yet an outstanding plan [48] developed by our younger generation has been ignored completely. Even more competitive than base-load solar power generation (which is ideal for Australia's arid open lands) is molten salt nuclear power. This is both clean and safe [49,50] and has processed waste which becomes harmless after only 300 years. Our Asian neighbours will use this new technology and we should be part of the action, especially as we have some of the world's best thorium reserves. Finally our coal industry will not just wither away because of CO_2 causing diminishing of its sales. It will become a great asset in a future petrochemical industry (using its own CO_2 emissions to make new products). In due course this will eventuate as petroleum resources diminish and become too expensive.