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CELEBRATING 30 YEARS OF ENGINEERING EXCELLENCE

GRDMinproc LIMITED


12 February 2009

Committee Clerk
Standing Committee on Environment and Public Affairs
Legislative Council
Parliament House
PERTH WA 6000

**SUBMISSION TO THE STANDING COMMITTEE ON ENVIRONMENT AND PUBLIC AFFAIRS INQUIRY INTO MUNICIPAL WASTE MANAGEMENT IN WESTERN AUSTRALIA**

On behalf of GRD Minproc Limited I am pleased to present the attached submission for consideration by the Legislative Council Standing Committee.

GRD Minproc is a Perth headquartered engineering and project delivery company with broad experience across the resources sector. In addition, and of specific relevance to this inquiry, the company has designed an alternative waste treatment process that is in commercial operation within Australia and has been selected for use in the United Kingdom.

We believe sustainable waste management is a critical issue for Western Australia and we hope our submission will assist the Legislative Council Standing Committee with its deliberations.

Should the Standing Committee deem it appropriate, Mr Peter Kelsall, General Manager of GRD Minproc's Waste-to-Resources Group, or his chosen representative, would be prepared to appear before the inquiry to elaborate on this submission.

Yours faithfully

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# SUBMISSION BY GRD MINPROC LIMITED TO THE INQUIRY INTO MUNICIPAL WASTE MANAGEMENT IN WESTERN AUSTRALIA

**February 2009**

GRD Minproc is a wholly owned subsidiary of GRD Limited.

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# Contents

# 1. INTRODUCTION

GRD Minproc is pleased to provide this submission to the Inquiry into Municipal Waste Management in Western Australia by the Legislative Council Standing Committee on Environment and Public Affairs. The company does so based on its experience in developing an alternative to landfill through the application of resource recovery to municipal solid waste (MSW).

Recently celebrating its 30th anniversary, GRD Minproc is a leading Australian engineering and project delivery business providing high value services and specialising in the design, procurement and construction of mineral resource and waste-to-resources projects.

GRD Minproc's technical expertise in process engineering and project delivery is internationally recognised and, over the last three decades, the company has successfully completed more than 400 feasibility studies and over 240 major design and construction projects in more than 35 countries across the globe.

GRD Minproc is a wholly owned subsidiary of GRD Limited headquartered in Perth and an acknowledged provider of engineering innovation.

The company used the skills of its engineers and designers to push beyond the boundaries of mineral processing and apply their expertise to a new challenge, recovering resources from waste. In doing so they have developed the UR-3R Process® a mechanical/biological process that treats household rubbish as an urban ore body containing valuable resources. Complementing the concept of resource recovery, UR-3R™ is an environmentally sound technology that addresses a growing world problem, the landfilling of waste and its associated pollutants.

The UR-3R™ waste-to-resources solution developed by GRD Minproc is now in commercial operation at Eastern Creek in Sydney, which was designed to process 10 per cent of Sydney's municipal waste. Furthermore, UR-3R™ has been chosen to process the household rubbish of 1.4 million people in the English county of Lancashire. GRD Minproc has designed and is currently involved in the construction of this major project worth £700 million.

Construction of UR-3R™ Facility at Leyland, United Kingdom

Before addressing the specific criteria of the inquiry, we believe it is important to underline the requirement for Western Australia, and in fact the nation, to deal with the issue of municipal waste disposal in a timely and sustainable manner. Key to this is the fact that landfill can no longer be regarded as an appropriate solution for the large-scale management of waste.

In Australia's urban consumer economy, 80 per cent of saleable products become waste within six months, and most municipal solid waste goes to landfill where it can generate leachate and methane gas for many decades.

Recovered recyclables

Disposing of municipal solid waste to landfill has adverse long-term environmental, economic and social impacts, mainly through:

- production of virile greenhouse gases (eg methane is 23 times worse than carbon dioxide as an agent contributing to atmospheric warming);
- contamination of groundwater;
- resource depletion and the waste of embodied energy through the need to create replacement products from virgin materials;
- quarantining from other uses of the land contaminated by waste, and
- Loss of amenity to the surrounding area.

It should be clear from this that landfill has had its day. While the case study for this inquiry, the Regional Resource Recovery Centre (RRRC) in Canning Vale, continues to face challenges it is a quantum leap in front of the traditional dump and bury rubbish tip.

## 2. ODOUR ISSUES AT THE CANNING VALE FACILITY

The RRRC at Canning Vale (RRRC) has a history of complaints regarding the odours emitted from the facility, these complaints continue despite the remedial works that have been undertaken. This has resulted in the presentation to Parliament of a petition by local residents to have the facility closed and/or relocated. For the SMRC these options are neither economical nor appropriate for modern waste management. Relocation of the facility would be cost prohibitive from both a capital and an operating cost perspective. Additionally it will be extremely difficult to find a new site for the facility for reasons stated in the petition unless it is located much further away from the waste catchment areas thus significantly increasing collection costs. Closure, without replacement would result in a return to landfill practices of the past, a retrograde step away from the resource recovery practices demanded by a modern, environmentally aware and progressive society.

In GRD Minproc's opinion there is a solution for the existing problems experienced at the RRRC despite the apparent lack of success of previous efforts. It is our belief that the problem will have an engineered solution. However, we suspect that to satisfy the residents the resolution of the problem will require a detailed process of involvement and liaison so that an appreciation of the cause and the solution to be implemented can be gained.

A subsidiary of our parent company had a similar issue at the Eastern Creek facility (EC) in New South Wales (the Facility is no longer owned by the GRD Group). A neighbouring business made a series of complaints about odour emanating from the site. The root causes of the odour problems at the EC facility were found to be a failure of the aeration system in the compost hall and the performance of the biofilter. These issues were subsequently resolved in 2006 by the replacement of the compost aeration system and the redesign/reconstruction of the biofilter. Subsequently the neighbouring business made no further complaints and has reported no impact from the EC operation.

Further to its experience at Eastern Creek, GRD Minproc has been responsible for engineering two state of the art waste treatment facilities for the Lancashire Waste Partnership in the United Kingdom. This project includes two facilities capable of treating a combined total of approximately 600,000tpa of residential waste including 350,000tpa MSW, 110,000tpa green waste and 100,000tpa recyclables. At one of the sites there are homes located approximately 100m from the boundary of the facility. Some residents have raised concerns of possible odour and noise issues when the facility becomes operational in 2010. This has required a number of engineering controls on top of those undertaken and improved on at EC to be implemented to satisfy the stringent requirements of the Lancashire local authorities. As a result of our experience in the design and operation of the EC facility and further engineering innovation and research in the development of the Lancashire project, we are confident of achieving success in odour control. For this reason, GRD Minproc has the confidence to say that there will be an odour control solution that can be engineered for RRRC.

Our company therefore recommends that further attempts should be made from an engineering perspective to resolve this issue at the RRRC. The starting point would be an audit of the foul air handling systems at the facility. The system could then be compared to the design of the systems developed for EC and Lancashire. Specific areas to be included in this review would be:

- Building design
- Ventilation system design
- Biofilter design and operation
- Compost aeration system design and operation

- Facility operations and control
- Ensuring all activities take place in doors
- The gaseous emissions from the biofilter are continuously monitored.

## 3. WASTE MANAGEMENT PRACTICES IN WESTERN AUSTRALIA

In addressing the future of the RRRC at Canning Vale it is appropriate to consider the challenges of the facility against the broader backdrop of the effectiveness of waste management practices and policy in Western Australia. It is the view of GRD Minproc that the issues experienced at Canning Vale are a symptom of the approach to waste management in this State.

While the Waste Avoidance and Resource Recovery Act of 2007 represents a marked improvement in the policy framework for waste management in Western Australia (taking waste services out of the State's health statutes and into the area of environment) it is our view that the legislation, and through it the creation of the Waste Authority of WA, also represents a missed opportunity.

This is not intended to take away from the importance of such measures as the development of a statewide waste strategy and waste plans for individual local government bodies; however, it is clear that the State's vision of Zero Waste by 2020 will be difficult, and likely impossible, to achieve unless decisive steps are taken to significantly and rapidly curb the amount of waste being sent to landfill. Based on the Government's statistics, 1.35 million tonnes of municipal solid waste were generated in Western Australia in 2006-07, equating to approximately 692 kilograms per person. Of this, over 75 per cent was dumped into landfill.

It is clear therefore that unless policy makers implement both stepped bans on the amount of waste going to landfill and actively assist in the development of an advanced waste treatment (AWT) industry in the State, WA will tread water if it remains largely reliant on kerbside recycling to achieve its waste management goals. It should be noted that previous and current efforts to establish AWT facilities in Western Australia have not been easy. For example, the RRRC at Canning Vale has been plagued by odour complaints yet action to rectify the problem has been hampered partly by the lack of cohesion between the member councils and the time taken to be able to reach agreement on the funding to rectify the problem; there have been ongoing issues with the Mindarie Resource Recovery Facility in terms of delays, appropriate tonnages and changes to the selected consortia; while the South East Metropolitan Regional Council's development of a facility seems stuck in the feasibility study stage – four years and counting.

This is generally a symptom of the inconsistent attitude nationally towards waste management and in the absence of a co-ordinated approach through forums such as the Council of Australian Governments (COAG) the States must go it alone.

## 4. INTERNATIONAL TRENDS

Around the world a number of governments have taken significant decisions on the landfilling of waste. For example, Germany banned landfilling of material with greater than 5 per cent organic content in 2005 and Sweden implemented a ban on putrescible waste to landfill from 2002. These measures flowed from a decision by the European Union in 1999 to introduce the Landfill Directive requiring all EU members to reduce the amount of MSW being sent to landfill. Given the potential of organics to degrade in landfill, generating methane and contributing to global warming, the Landfill Directive seeks to reduce the degradable fraction being landfilled in the interests of sustainability and to improve resource recovery.

An appropriate case study is the United Kingdom, where they have adopted a series of market based instruments to achieve this. Central to the changes is the requirement for local governments to meet strict targets:

By 2010, councils must reduce the amount of MSW landfilled to 75 per cent of 1995 levels.

By 2013, reduce the amount to 50 per cent.

By 2020, reduce the amount to 35 per cent.

This directive has meant that councils must develop alternatives to dumping and invest in technologies such as Energy from Waste (EfW) or Alternative Waste Treatment (AWT). As part of the process, local government bodies are given a landfill allowance; those who exceed the allowance are liable to a financial penalty of £150 per tonne/annum.

To help local government authorities meet their obligations under the EU Landfill Directive, The UK Government has established the Landfill Allowance Trading Scheme (LATS). Under the scheme, each local government or waste disposal authority is able to determine how to use its allocation of allowances in the most effective way.

Authorities are able to trade allowances; save them for future years (bank) or use some of their future allowances in advance (borrow). Trading is not mandatory, but is sold to local government as an opportunity.

Unlimited banking is allowed between target years and authorities are able to borrow up to 5 per cent of next year's allowance.

The scheme is also seen as an encouragement for councils to reduce their landfilling practices even beyond their allocated allowance. In the first year of the trading scheme (2005/06) the total quantity of municipal solid waste that could be landfilled in England was 15,196,000 tonnes. The actual amount that was landfilled was 12,386,666 tonnes, 18.5 per cent less than was allocated. This allocation will decrease significantly from 2010.

The first sale of landfill allocations took place in Hampshire, where a local authority sold 138,000 tonnes of its allocation for £2.7 million.

The LATS scheme is one of a number of mechanisms implemented in the UK to support change. The UK Government has adopted a `carrot and stick' approach to make things happen.

## 5. WESTERN AUSTRALIA

While the WA Government is increasing the 'size of the stick' by tripling the landfill levy to $9 by 2010, it will still be at a low level relative to the true cost of landfill (ie impacts on climate, groundwater, inefficient use of resources etc) and fails to send an appropriate price signal to the market. The cost of landfilling needs also to equate to that of advanced waste treatment. Local councils are less likely to vigorously pursue resource recovery if the cost in dollar terms far outweighs that of dumping and burying waste in landfill.

Although in its infancy, it is the view of GRD Minproc that the newly constituted Waste Authority is lacking the key elements to make it an effective driver of waste strategy and more importantly the catalyst for implementation of such strategy.

Implementation of measures to achieve greater diversion and recycling rates is still very much the domain of local government authorities, either acting individually or in a regional grouping. The Waste Authority's former incarnation, the Waste Management Board, identified that "local government faces great challenges upholding that responsibility" and that the significant barriers to greater waste reduction and resource recovery included a "lack of comprehensive resource recovery infrastructure planning" and "difficulty for organisations entering into multi-million dollar contracts over long timeframes". In short the implementation of new resource recovery facilities is being hampered by local government processes which lack the required scale, security and expertise.

The most logical solution is for the WA Government to become practically involved in the planning for, and most importantly, procurement of waste infrastructure. The Waste Authority should be taking responsibility for waste based resource recovery from planning to execution. Such a body would be focussed on infrastructure delivery not environmental regulation and be staffed by a multi-disciplinary team – ie infrastructure development, contracts experts. This model would leave local government authorities to manage the local collection but not waste disposal/treatment. The reasons for this are further expanded in the next section.

# 6. RURAL AND METROPOLITAN REGIONAL COUNCILS

## 6.1 Function

The key function of these bodies is to implement government policy determined by a centralised body or department such as the Waste Authority and to conduct the logistical functions of waste management. Although some Regional Councils have operated successfully in the past, overall they have lacked strategic surety which has at times led to ad hoc policies and performance resulting in a fragmented approach to waste management.

## 6.2 Effectiveness

Regional councils have been most effective when conducting the day to day requirements of waste management such as waste collection and landfill operations.

During the past decade the whole waste management regime worldwide has been undergoing a radical transition to a Resource Recovery model during the past decade to the point where waste management has now become a misnomer for resource recovery in the jurisdictions of most developed countries. This transition has also been happening in Western Australia during the last five years, however due to the lack of a central controlling body, a waste management mindset and the historical flexibility councils have enjoyed in determining waste management practices, regional councils have struggled to come to grips with the higher complexities of resource recovery. At times this has led to an inappropriate result for waste management practices in this state. This situation will only change by adopting a strong centralised strategy and reducing the total autonomy that councils have in determining waste management practices.

## 6.3 Efficiency

As previously stated, the regional councils have become very efficient at the collection component of waste management principally due to their accountability to the ratepayers in return for annual rates payments. Whilst this has been extremely effective at driving the traditional pick-up and dump services, it has hamstrung the councils when they consider the introduction of resource recovery policies.

This is primarily due to councils, quite understandably, being reluctant to institute practices that may increase the annual contributions of their ratepayers and in doing so having to contend with the potential political fallout. The result has been the propensity to opt for less than ideal resource recovery processes simply because they are competitive cost wise with the landfill rates currently being charged by councils.

This has resulted in a reduction in the efficiency of the councils because the solutions being implemented are at times less than ideal and in some cases are not inclusive of all councils in a given region due to difficulties in achieving consensus or cooperation. In some instances the economies of scale necessary to maximise the benefit and minimise the costs of resource recovery are not being achieved.

The optimum efficiencies are only likely to be achieved if responsibility for the decisions required to develop best practice resource recovery models is taken out of the hands of councils so they are not exposed to the potential political fallout. Furthermore, international experience has shown that true change requires legislative pressure to be applied to achieve particular targets and outcomes.

# 7. RESOURCE RECOVERY

## 7.1 Waste Hierarchy

The concept of resource recovery from the municipal waste stream has evolved over 40 years and started with simple recycling driven by the desire to divert materials from landfill and so extend landfill life. The cornerstone of the resource recovery movement is the waste hierarchy which ranks the mechanisms of waste reduction in order of importance and hence priority as an over arching principal to guide the development of waste management policy. The waste hierarchy is presented in Figure 1 below.


Figure 1: Waste Hierarchy

This concept has been refined in recent years as thinking has moved to a model of maximising the efficient use and recovery of materials and other resources to include energy as another resource to be recovered. The highest components in the hierarchy, prevention and minimisation, are an extremely important part of a mature contemporary waste strategy; however, they are not, as we see it, part of the primary focus of this enquiry. We have therefore concentrated on the issue of resource recovery from the existing waste stream.

The waste hierarchy identifies disposal (landfill) as being the least favourable outcome for waste management and quite correctly should be the outcome of last resort.

The most advanced system of resource recovery, as we have already identified, is to be found in the European Union. During the last decade they have embraced the concept by expanding the traditional recycling systems to include all waste streams including MSW and have recently elevated residual embodied energy to the status of a resource. Almost all waste streams have effectively been transformed into resource streams and are being treated accordingly. This may be seen in the EU directive that banned the landfill of putrescible wastes in 2005 and more recently the directive requiring member countries to reduce the quantity of waste going to landfill to 50 per cent or less by 2013.

Although similar legislation has not yet been enacted in Australia, it surely must come. It is therefore timely that this inquiry has been initiated as it has the potential to lay the cornerstones of an advanced resource recovery model for waste management in Western Australia.

## 7.2 Recent Developments – Alternative Waste Treatment

The last decade has seen the evolution of resource recovery processes from Mechanical/Biological Treatment (MBT) plants to most recently Alternative Waste Treatment (AWT) facilities around the world.

In the early part of the decade MBT plants were developed which were primarily focused on the separation and treatment of organics to either remove them from landfill or reduce the impact of these materials when they were subsequently disposed of to landfill. Resource recovery was clearly of secondary importance.

A good example of such facilities is the Bedminster plants such as the RRRC at Canning Vale where little effort is made in these facilities to recover recyclable resources from co-mingled waste. However, the philosophy started to change as more emphasis was placed on resource recovery beyond kerbside sorting. GRD Minproc led the way in promoting this new philosophy with the development of the UR-3R Process®. Until the UR-3R™ facility at Eastern Creek was built, most waste treatment proponents considered resource recovery from this material to be unviable, considering the waste stream to be too dirty to enable saleable resources to be recovered and many predicted that the process would fail. However, in the ensuing years the recovery of resources from household waste has become accepted and the concept of AWT processes that include organic processing and resource recovery was developed. It is now becoming common practice that long standing MBT processes are including a resource recovery process at the front end. It should be noted the UR-3R Process® still leads the way by recovering a more comprehensive range of recyclables than its competitors.

Examples of AWT technologies in Australia include the UR-3R Process® developed by GRD Minproc, more recently the Arrowbio process currently being commissioned at McArthur Park in Sydney's south west and the Dicom process being developed in Western Australia. In all three processes the waste is separated into two streams, an organic rich stream and a stream containing the majority of the recyclable materials such as paper, cardboard, plastic film and bottles and metals.

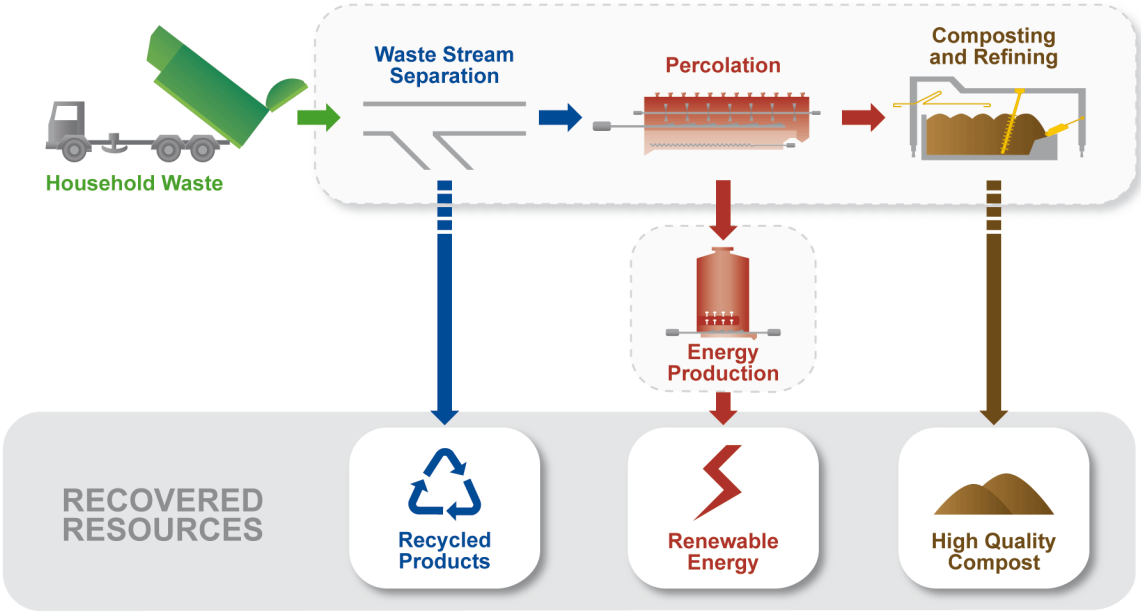


Figure 2: Alternative Waste Treatment – The UR-3R Process®

Separation early in the process effectively isolates the recyclables from the 'dirty' organics and allows the implementation of various sorting technologies to recover the recyclable resources in a condition suitable for sale.

The organic materials are then subjected to an anaerobic digestion process to recover energy in the form of biogas which is then used to generate power. The final organic residue is usually composted to produce 'stabilised' organics that can either be applied for land remediation and soil improvement, or sent to landfill. Stabilisation reduces the methane and leachate generating capacity of the material thus rendering it safer to landfill. However, disposing of this material in landfills (as per German practices) must still be viewed as the loss of a resource.

Another beneficial outcome of these processes is the removal through front-end sorting of hazardous materials such as lead-acid batteries, dry cell batteries, electronics and gas bottles from the waste stream that have conventionally been sent to landfill. Experience at the Eastern Creek UR-3R™ facility has shown that heavy metal contamination of the organic fraction of the waste stream can, as a result, be reduced to below the levels required by Australian standards.

### 7.3 Thermal Energy Recovery Processes

The European Union has also embraced energy recovery from waste as a legitimate form of resource recovery.

The latest development in technology is a move away from mass burn incineration towards facilities that utilise manufactured fuels called Refuse Derived Fuel (RDF). Mass burn incineration burns the entire waste stream as received, whilst the new style RDF technology burns the non-recyclable residue that remains after resource recovery. This fraction, constituting approximately 30 per cent of the MSW stream, is cleaner than conventional mass burn feed material having had the majority of hazardous and pollution causing materials removed in the resource recovery process before being sent to the burner. The material also has a higher calorific value, (typically > 15MJ/kg), represents only a fraction of the waste stream and contains mainly materials that cannot currently be recycled such as shoes, textiles and old toys.

State of the art Energy from Waste facilities are becoming relatively common in the EU and are typically high efficiency circulating fluidised bed burners or gasification facilities. The advent of circulating fluidised bed burners has further reduced the emissions issues that plagued the old 'mass-burn' facilities by advances in burner design and flue gas scrubbing. Gasifiers convert the residue into a synthetic natural gas (or Syngas) that is then used in gas fired generators to produce renewable energy. The generators only release gases with the same composition as any other gas fired generator.

An opportunity exists in Perth to elevate the residue material from the AWT facilities in the waste hierarchy by recovering the embodied energy through the installation of a single EfW facility that would treat all of the residual waste streams from the AWT facilities (such as the RRRC). A combination of AWT facilities and one such burner could divert approximately 95 per cent of MSW waste from landfill.

This maximum resource recovery mindset reflects the type of action required if Western Australia is to make significant inroads into the waste management issues confronting the State.

## 8. CONCLUSION

The following points summarise the key elements of this submission:

- Relocation of the Regional Resource Recovery Centre would be economically unviable. Its closure in favour of landfill would also be a retrograde step in the development of advanced waste treatment in Western Australia. In GRD Minproc's opinion there is a solution for the existing problems experienced at the RRRC. Despite the apparent lack of success of previous efforts, it is our belief that the odour problem can be solved by an engineered solution.

- Western Australia will not achieve the stated aim of Zero Waste 2020 unless it makes giant strides now towards phasing out landfill and embracing resource recovery.
- In the absence of leadership at a national level, Western Australia should follow the example set by international policy makers such as the European Union by legislating and regulating against the landfilling of municipal solid waste.
- The Waste Authority's role must be expanded beyond strategy and policy development to responsibility for waste based resource recovery from planning to execution. Such a body would be focussed on infrastructure delivery not environmental regulation and be staffed by a multi-disciplinary team – ie infrastructure development, contracts experts.
- The metropolitan regional councils and local authorities currently have a number of challenges in the waste collection and treatment cycle without the additional burden of the implementation of resource from waste solutions as required by the Zero Waste 2020 objectives.
- Alternative waste technology exists that would enable a 95 per cent diversion from landfill to be achieved, this would however require an integrated Western Australian approach.

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