Do I have to connect into the Sewer if I am in NSW?

Dr Terry Lustig, Director, Enviroloo Composting Toilets

I don't think so. However, let me stress that I am not a lawyer. If you wish to act on these ideas, I suggest you should consult a lawyer first.

Does the Local Government Act give Council the power to make me connect to the sewer?

If your property is in NSW, the Local Government Act (Section 124) says the Council can make you connect. However Section 124 states that this power is conferred in order to preserve healthy conditions. It would follow that if your system does not create unhealthy conditons, the power of Council to make one connect into the sewer becomes much weaker. Certainly, if the Council wants you to connect merely to preserve its rating base, its power to compel you is doubtful.

How Does the Clean Waters Act help me resist Council demands?

The Clean Waters Act - which overrides the Local Government Act - says you mustn't pollute. If the sewer is polluting the environment, the Clean Waters Act should enable you to resist the demands of Council, provided you have an on-site system which doesn't pollute.

Section 4 of the Clean Waters Act says that it overrides all other Acts when there is an inconsistency. This means that where there is a conflict between the Local Government Act and the Clean Waters Act, the requirements of the Clean Waters Act must be followed.

Section 5 defines "pollution" as somehow causing a substance to enter waters so that:

- the physical, chemical or biological condition is changed,
- OR makes the waters unclean, unsafe,
- OR does not comply with a prescribed standard.

Section 16 of the Clean Waters Act states that one must not pollute the environment, nor cause pollution, nor permit pollution. So if a council insists that you connect into the sewer, they can only do so if that sewer does not pollute, because otherwise they would be causing you to add to the existing pollution.

Section 17 allows a person to discharge pollutants into the environment, provided he or she does so in conformity with a licence. This licence is issued by the Environment Protection Authority, and in some cases in NSW, the licence conditions are not always very stringent. Even so, sewers do not always conform to their licence conditions, and this means that a person connected into a sewer will sometimes be contributing to pollution.

If we connect into a sewer, which is polluting, am I in breach of the Clean Waters Act?

No. **Clause 20** of the Regulations states that if you connect into a licensed sewer, you are not subject to the provisions of Section 16 of the Act. This would apply even if the sewer is polluting.

However, this Clause does not absolve Council! That is, if Council **causes you** to connect into the sewer, it could be in breach of the Clean Waters Act, even though you are not.

Can Council still charge me sewer rates?

This would be a matter for the courts. It all depends on how they would interpret the word "cause". For example, if a Council "causes" you to connect to its sewer because you have to pay its sewer rates anyway, this might turn out to be a breach of Section 16.

Is it possible for me to put in a waste treatment system which doesn't pollute?

Yes, provided you have some room in the backyard. For example, with a composting toilet and a properly designed greywater treatment system, you might need as little as 13m² of backyard. If properly maintained, such a system will not pollute.

Why can a composting toilet and greywater system avoid polluting the environment when water-based systems can't?

Basically, water-based systems for treating bodily wastes are technologically inferior to those which compost. Water-based systems exclude oxygen from the wastes, and during treatment, large amounts of energy are needed to try to introduce oxygen during treatment. The cost of piping, pumping and treatment can be very expensive and, if the job isn't done well because funds are limited, the effluent pollutes the environment. Also, the effluent from many sewerage treatment plants still contain disease organisms. With a composting toilet, all disease organisms die before the waste is removed. Further, the greywater is usually harmless, soapy water. If it does carry a disease organism, the greywater treatment system will usually be able to treat it very easily, since there will rarely be many of them.

Why do Sanitation Authorities insist on centralised sewerage systems?

Centralised systems are justified by many wastewater engineers by the assertion that people cannot be trusted to look after their own wastes. This assertion is demonstrably false. Fifteen per cent of Australians and 35% of (US) Americans look after their own wastes without succumbing to regular infections.

Further, the case for centralised sewerage systems as a means for reducing disease is hardly compelling. There are many cities in developing countries where centralised sewerage systems have not been successful. In fact, studies in developing countries have shown that provided the equipment for handling the bodily wastes is satisfactory and the water supply is adequate, the main way to reduce sanitation-related disease appears to be the use of appropriate hygienic practices by the household. It would follow that in a developed country where there is already hygiene education, there is no justification for preference being given to centralised water-based systems ahead of on-site composting systems.

If we seek the explanation for the preference by wastewater engineers for centralised systems, nothing can be elicited clearly from the literature. Indeed, the findings of the UK Royal Commission on Sewage Disposal in 1908 recommended neither water-based nor non-water-based systems as being inherently superior. In fact, it has been documented how the early introduction of sewerage into Britain was responsible for tens of thousands of deaths. The development of centralised systems to handle the effluent from water closets was very much a process of trial-and-error. One might speculate that had the effort to improve early centralised sewerage technology been applied instead to dry on-site systems, we might have had the present-day developments in composting toilets much earlier.

There remains the argument in favour of centralised sewerage systems, that frequently on-site systems such as septic tanks and aerated water treatment systems do not work properly. However, this is normally not so much as an indictment of the on-site technologies as the regulatory systems administered by our sanitation authorities.

For example in NSW:-

- there are no State guidelines for the design of absorption trenches;
- the allowable layout of the septic tank is inadequate;
- the EPA refuses to involve itself in on-site household systems, other than aerated water treatment equipment;
- the Department of Health does not have sufficient expertise to formulate proper guidelines;
- there are no mechanisms for regular checks of on-site systems.

A simple means of ensuring that on-site systems are working properly would be to institute a system of licenses such as with motor vehicles. We could require all owners of on-site systems

to renew their licenses every 3 to 5 years. One condition for renewal would be clearance by an approved person such as a certified plumber.

To summarise, if you are interested in avoiding connecting into the sewer, you might consider asking your lawyer:-

- whether the Local Government Act gives Council the power to make you connect to the sewer, if you are using a safe on-site system such as a composting toilet and greywater treatment system;
- whether Council would be in breach of the Clean Waters Act by making you connect;
- whether Council could still charge you sewer rates.

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Peter Hamilton

Bodhi Farm

ENVIRONMENTAL MANAGEMENT Pty. Ltd.

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File

31-August, 1993

Barry Sheedy, Project Manager
National Water Quality Management Strategy
Melbourne Water
PO Box 4342
Melbourne VIC 3001

Sct-rent to Ralph-Dawn

Dear Barry

Composting Toilets

Thank you for your letter of 30/7/93 requesting further information which is enclosed. My thesis is that water-based systems for treating bodily wastes are inferior to those which compost. Water-based systems exclude oxygen, and thus necessitate relatively large amounts of energy to try to introduce oxygen during treatment.

Such problems with this technology are compounded by the emphasis being placed on centralised systems. This is justified by many wastewater engineeers by the assertion that people cannot be trusted to look after their own wastes.

This assertion is demonstrably false. Fifteen per cent of Australians and 35% of (US) Americans look after their own wastes. Further, the case for centralised sewerage systems as a means for reducing disease is hardly compelling. There are many cities in developing countries where centralised sewerage systems have not been successful (McGarry, 1982). As Boot and Cairncross (1993) and Esrey and others (1990) have indicated, provided the equipment for handling the bodily wastes is satisfactory and the water supply is adequate in a developing country, the prime determinant of the reduction in sanitation-related disease appears to be the use of appropriate hygienic practices by the household. It would follow that in a developed country where hygiene education can be reasonably assured, there is no justification for preference being given to centralised water-based systems ahead of on-site composting systems.

If we seek the explanation for the preference by wastewater engineers for centralised systems, nothing can be elicited clearly from the literature. Indeed as Beder (1993) has pointed out, the findings of the Royal Commission on Sewage Disposal in 1908 recommended neither water-based nor non-water-based systems as being inherently superior. Indeed Poore (1893), a doctor, has documented how the early widespread introduction of sewerage into Britian was responsible for hundreds of thousands of deaths, and Feachem and others (1980) have emphasised that the development of centralised systems to handle the effluent from water closets was very much a process of trial-and-error. One might speculate that had the effort to improve early centralised sewerage technology been applied instead to dry on-site systems, we would have had the present-day developments in composting toilets much earlier.

Why was preference given to centralised water-based systems? The only explanation I and some other wastewater engineers have hypothesised (independently of each other) is that centralised systems could justify the use of engineers, while with on-site systems, the cost of an engineer may frequently have appeared as disproportionately high.

It is much easier to avoid pollution of the environment with a composting toilet and on-site greywater treatment system than with combined sewage systems, whether on-site or centralised. As I mentioned in my previous letter, I can design on-site systems which have no pathogens (except perhaps Ascaris eggs), and which do not pollute. The area required for greywater treatment can be as little as 13m² for a normal household of 5 people.

There remains the argument in favour of centralised sewerage systems, that frequently on-site systems such as septic tanks and aerated water treatment systems do not work properly. However, this is normally not so much as an indictment of the on-site technologies as the regulatory systems.

For example in NSW:-

- there are no State guidelines for the design of absorption trenches;
- the allowable layout of the septic tank is inadequate;
- the EPA refuses to involve itself in on-site household systems, other than aerated water treatment equipment;
- the Department of Health does not have sufficient expertise to formulate proper guidelines;
- there are no mechanisms for regular checks of on-site systems.

A simple means of ensuring that on-site systems are working properly is to institute a system of licenses such as with motor vehicles. We could require all owners of on-site systems to renew their licenses every 3 to 5 years. One condition for renewal would be certification by an approved person such as a certified plumber.

Yours sincerely,

Terry Lustig

Dr. Terry Lustig
Director

Enclosed: - not incl with c.c.s

- Extract from Boot and Cairncross
- Information on composting toilets
- Information on greywater treatment
- Article in Owner Builder

- Report to Bundagen Cooperative
- Report to Chris and Tony Iolini
- Report to Geoff and Dianne Inkpen

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c.c. Colin Martin, Environment Equipment
Gavin Frost, Department of Health Val.
David Leece, EPA

ROTA-LOO
SOLAR

Details of an optional solar powered Rota-Loo.

a). BP 46 Watt solar module. (Solar Voltaic cells) BP246SR 3.2 Amps.

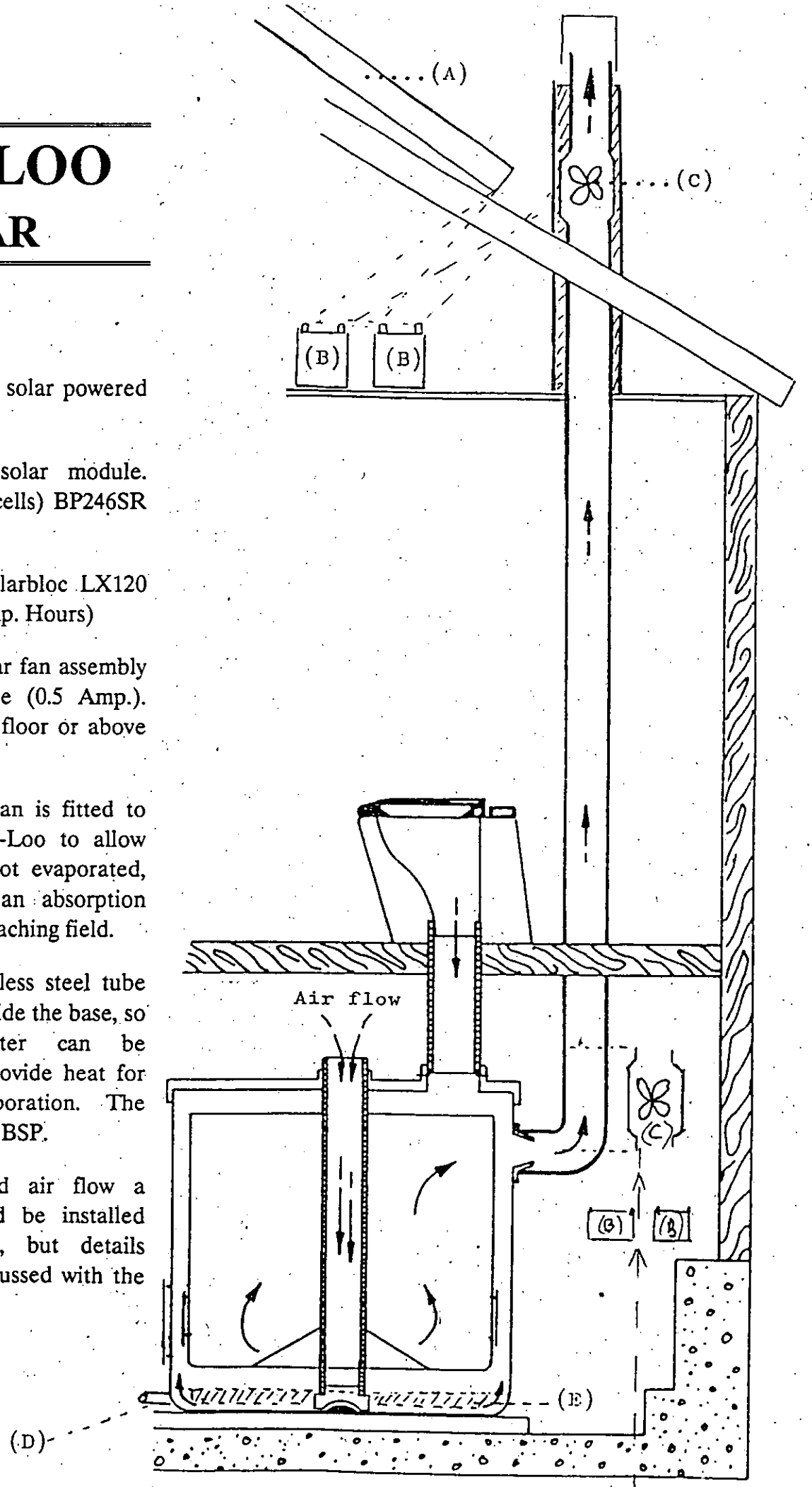
b). BP 12 Volt Solarbloc LX120 battery (120 Amp. Hours)

c). 12 Volt DC solar fan assembly and 12 V cable (0.5 Amp.). Installed below floor or above roof.

d). A drain cock can is fitted to the Solar Rota-Loo to allow excess liquid, not evaporated, to drain into an absorption trench and or leaching field.

e). A flexible stainless steel tube can be fitted inside the base, so that hot water can be circulated to provide heat for increased evaporation. The connection is ½" BSP.

To provide a heated air flow a Soltran module could be installed outside the building, but details would have to be discussed with the client.



Optional positions for the fan and batteries.

ROTA-LOO
SOLAR

Details of an optional solar powered Rota-Loo.

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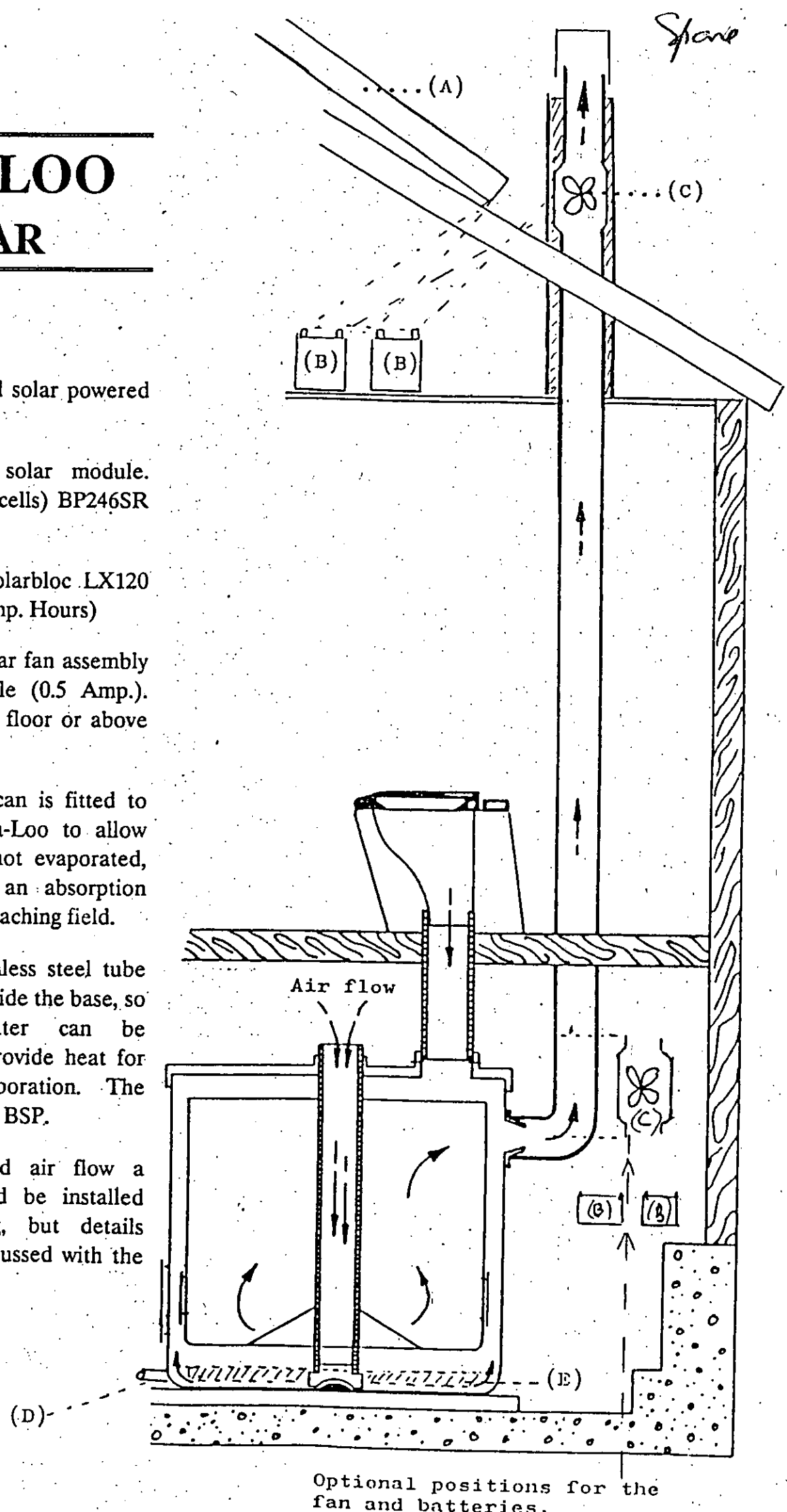

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ESS/92 File Copy

3 June, 1992

Ms Lisa Corbyn
Deputy Director
Environment Protection Authority
PO Box 367
Bankstown 2200

Dear Ms Corbyn

REGULATION OF DOMESTIC ON-SITE WASTEWATER TREATMENT SYSTEMS

I write once more following our earlier correspondence concerning on-site domestic waste treatment systems. You may recall that on 26th March 1991, I wrote to you urging the EPA to take over the regulation of composting toilets. At the time, you discussed this with Dr Frost, who indicated - as I gathered- that he wanted to finalise certain approvals which were being handled by his section of the Department of Health.

I am glad to say that there has been some substantial progress on this front although a number of matters remain outstanding.

Some of these problems have more to do with engineering than medical expertise. For example:-

- A septic tank in NSW does not need to be divided into two compartments, when it is well established that this is important for reducing the amount of suspended sediment which is washed into the absorption trenches (Cotteral and Norris, 1969; Kiker, 1956; Kreissl, 1982). It is important to keep the amount of sediment entering absorption trenches low so that they take longer to clog up.

- There are no NSW Government regulations or guidelines on the design of absorption trenches unlike in Victoria (DWR, 1990) or South Australia (SAHC, 1988). Consequently, the standards applied by the different Councils in NSW vary greatly and most are inadequate. Thus, many (if not most) absorption trenches treating the effluent from septic tanks clog up and the untreated effluent runs over the ground.

- Aerated water treatment systems are required to treat the effluent with chlorine or ozone. Both gases are suitable for eliminating pathogens from drinking water, but not for treating sewage (Bernhart, 1973; Feachem and others, 1980). Specifically, chlorine does not kill viruses (De Michele, 1975; Longley and others, 1975), and ozone does not kill bacteria (Longley and others, 1975). Chlorine also kills beneficial

bacteria and produces trihalomethanes (Bernhart, 1973; Feachem and others, 1980).

- Aerated water treatment systems are allowed to spray the effluent into the atmosphere. Viruses and bacteria can be carried over a kilometre by aerosols (Adams and Spendlove, 1970; Sorber and Guter, 1975) and have been documented to increase infection hundreds of metres away (Katzenelson and others, 1976).

- There is no distinction made in NSW between the area of absorption trenches required for septic tank effluent from combined domestic waste and that required for septic tank effluent which treats only sullage. The area required of the latter is typically 20 to 25% of the former (Siegrist & Boyle, 1987).

Whole areas of NSW are subject to non-point-source pollution. Much of this comes from poorly functioning on-site domestic waste treatment systems.

I would urge you to give strong consideration to your Authority taking on greater responsibility for this problem than it has in the past. At present, some of your officers do not appear to be as well informed on the options for on-site waste treatment as they might. As an instance of this, I enclose a submission we made recently to Blue Mountains City Council in response to their draft Development Control Plan dealing with on-site waste treatment systems. I believe this draft relied heavily on advice from the then State Pollution Control Commission.

Finally, I would like to suggest that your Authority and our company put in a joint submission for funds to investigate sullage disposal systems. There has been a fair bit of work on waste disposal systems which treat combined domestic sewerage. As far as I have been able to ascertain, there has not been any work on the treatment of sullage disposal systems in Australia.

I would also like to suggest a joint epidemiological study to compare the health hazards from on-site systems with those from conventional centralized sewerage systems. The information I have been able to collect so far indicates that contrary to popular perception among many wastewater engineers, the hazard is no greater in on-site systems than in centralised ones.

Since the former systems use fewer resources and are cheaper than the latter, such a study could be a valuable contribution to the promotion of Ecologically Sustainable Development.

Yours faithfully,

T. Lustig

Dr. Terry Lustig
Director

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cc. Dr Gavin Frost

A CASE FOR COMPOSTING TOILETS.

By Dr. Terry Lustig.

"This [nineteenth] century has been by far the most remarkable, in the intellectual history of the world, for its great progress in scientific discovery and invention. But in the midst of all the beneficial inventions made during the period, there is one which is wholly evil - I mean the water-closet."

So wrote Charles Richardson, an engineer of the 1890's. Richardson's main objection to water-carriage sewerage was that it enlarged a small problem into a big one. When we observe, a century later, the invective directed towards our sewerage authorities, the massive funds being poured into upgrading sewerage systems around the developed world, the inability of developing countries to follow suit simply because they cannot afford it, and the pollution of our waterways by the effluent from septic tanks, we might acknowledge that Richardson seems to have had a point.

The water closet is nowadays considered to be an essential feature of modern life. Yet it is not generally realised that modern water-carriage sewerage is not an optimal solution to the problem of minimising risks to the health of the community, but one which has been designed essentially for the convenience of the user.

In light of the very obvious environmental and economic inefficiencies of public sewerage systems, people began to look into alternative means of disposing of human excreta. One technique which was developed in Scandinavia two decades ago (although some of its predecessors were a century earlier), was the waterless toilet. These waterless or composting toilets produce a final waste which is far safer than any conventional water-carriage sewerage system. It is regrettable therefore that some authorities concerned with public health still insist that a septic tank for a domestic installation is to be preferred to a composting toilet.

This insistence is despite the fact that the concentrations in the effluent from a septic tank:-

- exceed what is allowable for activities where one could easily come into contact with the water (eg. wading and boating) by a factor of about 10,000;
- are roughly 200 times greater than what comes down Sydney's stormwater drains;
- can be double what is discharged from Malabar ocean outfall;
- are perhaps five to twenty times what comes out of a properly-operating secondary sewage treatment plant;
- are perhaps 1,000 times the concentration of effluent from a tertiary treatment plant;
- are of the order of a million times the concentration of what comes out of a composting toilet.

This is not all. The effluent from a septic tank can be worse than what comes into it. The blackwater from a water closet enters the septic tank and mixes with the sullage from other household activities. Sullage is very high in nutrients, whereas the nutrients in the toilet effluent are comparatively low, most having been removed in people's digestive systems.

This mixing provides the pathogens from the blackwater (possibly including those causing Hepatitis A, typhoid, TB, dysentery and poliovirus) with new nutrients, and the pathogens multiply very rapidly.

If this were not enough, septic tank systems often do not work. In a survey in the USA in 1980, it was found that 50% of septic tanks were not operating properly. The most common manifestation of failure of the septic tanks was that the absorption trenches were clogged. In Australia too, in areas where septic tanks are common, it is a frequent sight to see the effluent from septic tanks running down over the surface of gardens.

To make matters worse, where septic tanks are used in areas which are in the catchments of water supply storages or National Parks, the effluent from septic tanks can (and do) contaminate waterways. Pathogens from septic tanks have been documented to travel hundreds of meters through the ground.

The principle of operation of the composting toilet is very simple. Human excreta is deposited from the pedestal into a container which is

kept warm to promote the growth of bacteria. The bacteria digest the human excreta and render it into harmless compost, while a small fan extracts odours from the remaining wastes and expels them through a vent.

As long as the excreta is stored for long enough at a sufficiently high temperature, the pathogens in the human waste are eliminated. In the Rotaloo, for example, the excreta are stored in one of four chambers in a sealed tank. When the first chamber is full, it is rotated and the next chamber is filled. This continues until the final chamber is filled.

The first chamber is then emptied. This is quite safe to do, since the compost has been stored for one or two years, and the chances of a pathogen still being alive by then is very low: the risk is about the same as the danger of handling soil from the garden. As it is, the compost is buried in a shallow trench for another six months, and by then no pathogens could still be alive. The compost which is removed from such a composting toilet does not smell, and has the texture of leaf mould.

The essential point when comparing composting toilets like the Rotaloo with a septic tank is that the human wastes from a household of six people stay in the Rotaloo for one or two years before being removed, while in the septic tank it can be retained just 24 hours. (The retention time of a septic tank can often be less than 24 hours on occasions of peak loading such as during parties. Composting toilets can easily handle such peak loads without their capacity being impaired.) After one or two years, the only organism which might still survive is the egg from the Ascaris (roundworm). (Even so, ascariasis is not deadly.) Once the compost is buried, even the Ascaris ova are destroyed.

If a composting toilet is installed for a residence, a water-carriage system will still be needed to handle the sullage. However, the chances of a sullage system failing are far less than for a full septic tank, since most of the sludge is now deposited in the composting toilet.

There are a number of designs for treating sullage, but the basic layout should consist of:-

- a grease trap to take out some of the fats and oils from the kitchen sink;
- a small septic tank to provide pre-treatment to the wastewater - this tank should only require desludging every twenty years or so, since most of the solids have been diverted to the composting toilet;
- absorption trenches, which all too frequently have not been well designed nor properly installed. To help with uptake of nutrients and water, it is advisable to plant vegetables, grass, shrubs and even trees nearby. (Care must be taken however, not to have plants with aggressive root systems which could clog the distribution pipes.)

It is advisable to obtain proper advice before installing a sullage treatment system. Account needs to be taken of the number of people who will (or could), be using the household facilities; the capacities of the water-using facilities; the climate; the type of soil; the depth to the water table; and the distance to any surface watercourses or water bodies.

For example, if the water table is high during the wet season, it may be necessary to put the trenches in mounds which are placed on to the natural surface.

It is also important to design the trenches to ensure the large populations of soil fauna near the surface of the soil can process the nutrients in the wastewater. In many existing designs of absorption trenches, the wastewater all too often is permitted to percolate down to the water table and out of reach of the soil fauna.

The environmental and economic difficulties facing this country are well known. Composting toilets can help with both by:-

- reducing the pollution of our waterways and groundwaters;
- reducing the risks of infection from sewage;
- reducing the consumption of household water by up to 30%;
- reducing the cost of handling domestic wastes - it can cost from $4,300 to $14,000 (and even more) to provide sewerage to a residential block and the householder at least another $2,000 to $4,500 to connect in - a minimum total of $6,300 to $18,500. To install a waterless toilet and an on-site sullage disposal system costs about $3,000 to $6,000 in all.

Water-carriage sewerage, which was developed in Europe in the nineteenth century was introduced essentially to provide a convenient system which was "idiot proof". Today some health officials still justify their preference for water closets with the idea that people cannot be entrusted to look after themselves. Indeed, if we look at the fact that people are using septic tanks which have failed,

and which therefore are constituting a health risk, we can agree that it is often the case that people do not look after themselves. It is therefore surprising that septic tanks are still held to be preferable to composting toilets, a quality-controlled manufactured product which normally produces a compost with NO pathogens.

Dr. Terry Lustig is a Consulting Engineer with a particular interest and expertise in the area of waste water management. He is a director of the Sydney firm of Enviroloo and may be contacted by phone on (02) 66 22255.

ENVIROLOO

NSW Distributors of

BIOLET - ROTALOO COMPOSTING TOILETS

How To Save Time and Money When You Choose a Composting Toilet

We believe that when a person chooses a composting toilet for their house, they should be able to put it in easily and do as little as possible afterwards. After all, people have better things to do than spending their time looking after their toilet, and what better way than to let nature do all the work?

Many composting toilets are cheaper than the Rota-Loo, because they are simpler to construct. This is because they use a "continuous" system rather than the "batching" system. With the continuous system, new material is deposited at the top of the chamber and old composted material is removed from the bottom. This is fine, except you have to make sure you add enough wood shavings, or kitchen scraps, or grass clippings, or paper, or chopped up cardboard to provide extra carbon. You may also need to inspect the compost pile to see it isn't too wet nor too dry. As well, the pile may need regular (often weekly) raking or stirring to make sure it doesn't become one solid stinking, gluggy mass which can be very costly in time and money to fix. Alternatively, people may have to make sure they put in worms and other soil animals, and that these stay alive.

There is also a risk that people might put in disinfectants, or strong detergents, or fungicides or other chemicals. Or people may be on antibiotics which kill off the organisms which do the composting.

The batching system of the Rota-Loo gets around these problems very simply. As each batch chamber is filled, it is left **undisturbed** for over a year. So even if the owner doesn't add carbon or worms, or if the wrong materials are put into the batch, the natural processes will have time to start up again. Of course, if the owner does add carbon, worms and other soil animals into the Rota-Loo, the composting will be quicker and this will save you more time in the long run. But if you don't get around to it, you won't have a disaster on your hands.

It is extremely simple in the Rota-Loo to make sure that there is adequate moisture available for composting, and even if this simple step is not taken, there will still be no risk to health.

When you are comparing Rota-Loos with what else is around, don't forget to add in the cost of installation. The Rota-Loo takes half a working day, others can take four. One model is often buried over two metres into the ground.

To avoid pollution, the Rota-Loo is designed to evaporate the urine using solar or electrical heat. Other models rely on the heat produced by the composting. This is often not sufficient, particularly in cool climates, and especially if the tank is buried in the cool ground. The extra urine must then be drained into the ground. Unless you are careful, this drainage can clog up and pollute the groundwater. Some models pump the urine to a disposal area. This means there is another piece of machinery to maintain. The Rota-Loo has been designed to have a minimal number of moving parts, to make maintenance and repairs simpler. This reduces the load on your time, your pocket and on the environment.

And we don't stop there. We are always trying to improve our products to make our products even more simple and reliable, and of course there is always our toll-free number to call if you still have any problems.

In that way, we can make sure Enviroloo is the environmentally friendly way to go.

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ENVIRONMENTAL MANAGEMENT PTY LTD A.C.N. 003 520 705

Do I have to connect into the Sewer if I am in NSW?

Dr Terry Lustig, Director, Enviroloo Composting Toilets

I don't think so. However, let me stress that I am not a lawyer. If you wish to act on these ideas, I suggest you should consult a lawyer first.

Does the Local Government Act give Council the power to make me connect to the sewer?

If your property is in NSW, the Local Government Act (Section 124) says the Council can make you connect. However Section 124 states that this power is conferred in order to preserve healthy conditions. It would follow that if your system does not create unhealthy conditons, the power of Council to make one connect into the sewer becomes much weaker. Certainly, if the Council wants you to connect merely to preserve its rating base, its power to compel you is doubtful.

How Does the Clean Waters Act help me resist Council demands?

The Clean Waters Act - which overrides the Local Government Act - says you mustn't pollute. If the sewer is polluting the environment, the Clean Waters Act should enable you to resist the demands of Council, provided you have an on-site system which doesn't pollute.

Section 4 of the Clean Waters Act says that it overrides all other Acts when there is an inconsistency. This means that where there is a conflict between the Local Government Act and the Clean Waters Act, the requirements of the Clean Waters Act must be followed.

Section 5 defines "pollution" as somehow causing a substance to enter waters so that:

- the physical, chemical or biological condition is changed,
- OR makes the waters unclean, unsafe,
- OR does not comply with a prescribed standard.

Section 16 of the Clean Waters Act states that one must not pollute the environment, nor cause pollution, nor permit pollution. So if a council insists that you connect into the sewer, they can only do so if that sewer does not pollute, because otherwise they would be causing you to add to the existing pollution.

Section 17 allows a person to discharge pollutants into the environment, provided he or she does so in conformity with a licence. This licence is issued by the Environment Protection Authority, and in some cases in NSW, the licence conditions are not always very stringent. Even so, sewers do not always conform to their licence conditions, and this means that a person connected into a sewer will sometimes be contributing to pollution.

If we connect into a sewer, which is polluting, am I in breach of the Clean Waters Act?

No. **Clause 20** of the Regulations states that if you connect into a licensed sewer, you are not subject to the provisions of Section 16 of the Act. This would apply even if the sewer is polluting.

However, this Clause does not absolve Council! That is, if Council **causes you** to connect into the sewer, it could be in breach of the Clean Waters Act, even though you are not.

Can Council still charge me sewer rates?

This would be a matter for the courts. It all depends on how they would interpret the word "cause". For example, if a Council "causes" you to connect to its sewer because you have to pay its sewer rates anyway, this might turn out to be a breach of Section 16.

Is it possible for me to put in a waste treatment system which doesn't pollute?

Yes, provided you have some room in the backyard. For example, with a composting toilet and a properly designed greywater treatment system, you might need as little as 13m^2 of backyard. If properly maintained, such a system will not pollute.

Why can a composting toilet and greywater system avoid polluting the environment when water-based systems can't?

Basically, water-based systems for treating bodily wastes are technologically inferior to those which compost. Water-based systems exclude oxygen from the wastes, and during treatment, large amounts of energy are needed to try to introduce oxygen during treatment. The cost of piping, pumping and treatment can be very expensive and, if the job isn't done well because funds are limited, the effluent pollutes the environment. Also, the effluent from many sewerage treatment plants still contain disease organisms. With a composting toilet, all disease organisms die before the waste is removed. Further, the greywater is usually harmless, soapy water. If it does carry a disease organism, the greywater treatment system will usually be able to treat it very easily, since there will rarely be many of them.

Why do Sanitation Authorities insist on centralised sewerage systems?

Centralised systems are justified by many wastewater engineers by the assertion that people cannot be trusted to look after their own wastes. This assertion is demonstrably false. Fifteen per cent of Australians and 35% of (US) Americans look after their own wastes without succumbing to regular infections.

Further, the case for centralised sewerage systems as a means for reducing disease is hardly compelling. There are many cities in developing countries where centralised sewerage systems have not been successful. In fact, studies in developing countries have shown that provided the equipment for handling the bodily wastes is satisfactory and the water supply is adequate, the main way to reduce sanitation-related disease appears to be the use of appropriate hygienic practices by the household. It would follow that in a developed country where there is already hygiene education, there is no justification for preference being given to centralised water-based systems ahead of on-site composting systems.

If we seek the explanation for the preference by wastewater engineers for centralised systems, nothing can be elicited clearly from the literature. Indeed, the findings of the UK Royal Commission on Sewage Disposal in 1908 recommended neither water-based nor non-water-based systems as being inherently superior. In fact, it has been documented how the early introduction of sewerage into Britain was responsible for tens of thousands of deaths. The development of centralised systems to handle the effluent from water closets was very much a process of trial-and-error. One might speculate that had the effort to improve early centralised sewerage technology been applied instead to dry on-site systems, we might have had the present-day developments in composting toilets much earlier.

There remains the argument in favour of centralised sewerage systems, that frequently on-site systems such as septic tanks and aerated water treatment systems do not work properly. However, this is normally not so much as an indictment of the on-site technologies as the regulatory systems administered by our sanitation authorities.

For example in NSW:-

- there are no State guidelines for the design of absorption trenches;
- the allowable layout of the septic tank is inadequate;
- the EPA refuses to involve itself in on-site household systems, other than aerated water treatment equipment;
- the Department of Health does not have sufficient expertise to formulate proper guidelines;
- there are no mechanisms for regular checks of on-site systems.

A simple means of ensuring that on-site systems are working properly would be to institute a system of licenses such as with motor vehicles. We could require all owners of on-site systems

to renew their licenses every 3 to 5 years. One condition for renewal would be clearance by an approved person such as a certified plumber.

To summarise, if you are interested in avoiding connecting into the sewer, you might consider asking your lawyer:-

- whether the Local Government Act gives Council the power to make you connect to the sewer, if you are using a safe on-site system such as a composting toilet and greywater treatment system;
- whether Council would be in breach of the Clean Waters Act by making you connect;
- whether Council could still charge you sewer rates.

COST COMPARISON OF DOMESTIC WASTEWATER DISPOSAL EQUIPMENT

(May, 1991)

SMALL HOUSEHOLD

	Aerobic treatment system (small)	Biolet	Biolet with Enviroloo Greywater System*
Capital cost	4800	1750	4055
Cost of Installation	820	255	890
Total Installation	5620	2005	4945
Operation & Maintenance			
for 1 year	345	180	190
for 5 years	1725	900	950
for 10 years	3450	1800	1900
Total Cost			
After 1 year	5965	2185	5135
After 5 years	7345	2905	5895
After 10 years	9070	3805	6845

LARGE HOUSEHOLD

	Aerobic treatment system (large)	Rotaloo	Rotaloo with Enviroloo Greywater System	2 Biolets with Enviroloo Greywater System*
Capital cost	6500	4029	6334	5805
Cost of Installation	820	530	1170	890
Total Installation	7320	4559	7504	6695
Operation & Maintenance				
for 1 year	345	140	150	190
for 5 years	1725	700	750	950
for 10 years	3450	1400	1500	1900
Total Cost				
After 1 year	7665	4699	7654	6885
After 5 years	9045	5259	8254	7645
After 10 years	10770	5959	9004	8595

* The greywater system is for reasonably well drained soils such as sand or sandy loam. Areas with clayey soils may require mounded absorption trenches.

The operational costs are based on average electricity consumption @ 10 c per kilowatt hour in a climate such as Sydney's.

NSW HEALTH
DEPARTMENT

The Manager
Environment Equipment Pty.Ltd.
1/32 Jarrah Drive,
BRAESIDE. VICTORIA. 3195

PUBLIC HEALTH SERVICES BRANCH

C4214(2)

Local Government Act, 1919.
Ordinance 44. Clause 21A (3)

3/01/1992

CERTIFICATE OF APPROVAL NO.HC.002/92
APPROVED SEWAGE TREATMENT PROCESS

This is to certify that the system described hereunder, and submitted by :-

Environment Equipment Pty.Ltd.
1/32 Jarrah Drive,
BRAESIDE. VICTORIA. 3195

has been accepted by the NSW Health Department as an approved sewage treatment system and may now be installed on domestic premises in accordance with the provisions of Ordinance 44, Local Government Act, 1919., subject to the conditions endorsed hereon.

SYSTEM : ROTA-LOO HUMUS CLOSET.

DESCRIPTION : An aerobic composting sewage treatment facility designed to receive and treat faeces, urine and paper from one toilet pedestal. Quantities of organic material may be added to the composting wastes as a bulking agent at intervals specified by the manufacturer. The closet is designed to reduce such wastes after a specified composting period into an innocuous, relatively dry humus which is capable of being disposed of without nuisance or risk to health within the grounds of the premises. The Rota-Loo Humus Closet is suitable for installation at a single residential dwelling subject to the approval of the Local Authority.

The Rota-Loo Humus Closet consists of four (4) collection and composting chambers contained within an inner circular rotatable drum. The Rota-Loo has a rated capacity of five (5) persons when in continuous use. It is constructed from impervious glass fibre reinforced plastic and UPVC. The closet design incorporates a heating system to evaporate excess urine and moisture and to maintain a constant temperature in the pile to assist the composting action and an exhaust fan to control odour emissions from the composting process. By rotating the vessel each compartment will in turn be capable of being located beneath the waste shute so as to receive the toilet wastes. The inner drum and heating element are contained within an outer circular tank which is fitted with

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an access door for the removal of composted humus material. All sullage water from the premises must be discharged into an evapotranspiration, absorption system which has been designed to dispose of all of the sullage wastes generated on the site within the confines of the premises without nuisance or danger to health.

CONDITIONS OF ACCEPTANCE :

1. Installation of the Rota-Loo Humus Closet is restricted to a single residential dwelling, which provides sleeping accommodation for a maximum of five (5) persons and where in the opinion of the Local Authority the closet would be capable of providing satisfactory toilet accommodation.

2. In accordance with the Manufacturers' Specifications the maximum number of persons resident at the premises where the Rota-Loo Humus Closet is installed shall not exceed five (5).

3. All sullage water shall be disposed of by means of a disposal system designed in accordance with the requirements of AS 1547 and installed to the satisfaction of the Local Authority.

4. Installation of the Rota-Loo Humus Closet may only be approved by the Local Authority in accordance with the requirements of Clause 21A.,Ordinance 44, Local Government Act, 1919.

5. An application for approval to install a Rota-Loo Humus Closet shall be made in writing to the Local Authority.

6. For each proposed installation, the application to the Local Authority shall include:

6.1 Plans and specifications of the Rota-Loo Humus Closet; and

6.2 A site plan drawn to scale showing the location and type of the proposed sullage disposal system; and

6.3 A statement detailing the proposed method of disposal of the composted humus, the frequency of such disposal and the estimated volume of humus to be removed;

7. A permanent notice with basic instructions shall be affixed to the unit in a prominent position.

8. The permanent notice shall include provision for recording the date each chamber was commissioned and the date of removal of composted material.

9. The waste chute shall be cleansed at least daily or more frequently when it becomes fouled with excreta.

10. The manufacturer shall supply with each Closet a comprehensive manual with details of the maintenance procedures necessary to ensure the efficient and safe operation of the unit.

11. The Rota-Loo Humus Closet shall be installed and operated in accordance with the manufacturer's instructions and any conditions imposed by the Local Authority.

12. The fan fitted to the educt vent of the closet must be installed in such a manner so that it operates continuously. Easy access must be provided for repairs or replacement of the fan.

13. The minimum composting period for the Rota-Loo Humus Closet shall be not less than twelve (12) months. A statement to that effect must be included on any accompanying literature.

14. Humus material which has been only partially composted may only be removed from the Rota-Loo Humus Closet with the written consent of the Local Authority. The Local Authority may issue instructions as to who may remove the humus and the method of disposal of the humus.

15. Unless otherwise directed by either the Local Authority or the NSW Health Department, the composted humus material is to be disposed of by burial within the confines of the premises in soil which is not intended to be used for at least three (3) months for the cultivation of food for human consumption. The minimum cover of soil over the deposited humus shall be 75mm.

16. Alternatively the composted humus may be retained for an addional period of three (3) months in a lidded compost bin. At the completion of this further period of composting the humus may be used as a garden fertiliser without any further treatment.

17. Composted humus material may only be removed from the closet through the access door provided for that purpose at or near the base of the closet. The access door shall be kept closed at all times other than when composted humus is being removed.

18. The Rota-Loo Humus Closet may be located in a separate room inside the dwelling, provided part of the room is located on an external wall of the dwelling. The room shall be provided with natural light and ventilation in accordance with Clauses 50.2 and 50.8, Ordinance 70, Local Government Act, 1919. The closet room shall be rendered fly proof by the installation of fly screens on all windows.

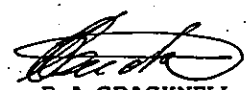
19. Direct access to the Rota-Loo Humus Closet shall not be provided through a habitable room, food storage or food preparation area.

20. If an airlock is provided within the building adjacent to the toilet room it shall be provided with natural light and ventilation in accordance with Clauses 50.2 and 50.8, Ordinance 70, Local Government Act, 1919.

21. Where the installation is to be external to the dwelling, the Rota-Loo Humus Closet is to be installed within a building constructed in accordance with the requirements of Clause 12, Ordinance 44, Local Government Act, 1919, as amended. In addition the closet room shal be rendered fly proof by the installation of fly screens on windows and a self closing fly screen door on the entry doorway.

22. Where the installation is to be external to the dwelling, the Rota-Loo Humus Closet is to be installed within a building constructed in accordance with the requirements of Clause 12, Ordinance 44, Local Government Act, 1919, as amended.

THIS CERTIFICATE IS VALID FROM THE DATE HEREON UNLESS WITHDRAWN OR CANCELLED BY THE NSW HEALTH DEPARTMENT.(THIS CERTIFICATE OF APPROVAL SUPERSEDES ALL PREVIOUS APPROVALS)



B.A.CRACKNELL
DEPUTY PRINCIPAL ENVIRONMENTAL HEALTH OFFICER

ENVIRONMENTAL MANAGEMENT Pty. Ltd.

A.C.N. 003 520 705

Environmental Engineering - Water Engineering - Systems Engineering

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3 September, 1993

The Project Officer
Attention: Mr Brian White
Dandenong Valley and Western Ports
Catchments Management Project
Environment Protection Authority
GPO Box 4395 QQ
Melbourne 3001

Dear Mr White

Draft Report on Water Pollution Control in the Mordialloc Creek, Dandenong Valley and Western Port Catchments

It is obvious from your report that you have attempted to formulate a wide-ranging and thorough plan to address the problems of environmental degradation in this catchment. It is disappointing therefore that you have not even mentioned a method of on-site treatment of domestic waste which produces no pollution, requires no chemicals, uses little energy, and entails minimal maintenance by the householder.

If a household uses a composting toilet for its human wastes, and a well-designed greywater treatment system (which need take up only as little as 13m² of a backyard), there need be no polluting waters leaving the property.

Water-borne sewerage systems are technically inappropriate to handling bodily wastes. When faeces drop into water, oxygen is excluded, preventing aerobic bacteria from decomposing the material quickly and naturally. Instead, oxygen must be introduced at the sewage treatment plant - an exercise which is costly in energy and finances.

The end product of a person using a water closet for a year is about 8 tonnes of wastewater. The end product of a person using a composting toilet for a year is about 20kg of safe compost which can be used on the garden.

When toilet wastes are excluded from the wastewater, the remaining greywater is much easier to treat. The BOD is much more soluble, the solids are more biodegradable, and most of the nitrogen is removed. If the householder avoids using phosphorus in the detergents, most of the phosphorus is eliminated from the wastewater as well.

I am designing greywater treatment systems using absorption trenches and/or reed-bed systems which can be easily incorporated into the landscaping of a household property. These systems are better for the environment than sewerage systems: they don't pollute, while sewerage systems do. Despite this, the current EPA regulations give preference to sewers. I have found no technical justification for such a bias. In fact, what evidence I have found indicates that the bias should be reversed.

The emphasis placed on centralised systems is justified by many wastewater engineeers by the assertion that people cannot be trusted to look after their own wastes.

This assertion is demonstrably false. Fifteen per cent of Australians and 35% of (US) Americans look after their own wastes. Further, the case for centralised sewerage systems as a means for reducing disease is hardly compelling. There are many cities in developing countries where centralised sewerage systems have not been successful (McGarry, 1982). As Boot and Cairncross (1993) and Esrey and others (1990) have indicated, provided the equipment for handling the bodily wastes is satisfactory and the water supply is adequate in a developing country, the prime determinant of the reduction in sanitation-related disease appears to be the use of appropriate hygienic practices by the household. It would follow that in a developed country where hygiene education can be reasonably assured, there is no justification for preference being given to centralised water-based systems ahead of on-site composting systems.

If we seek the explanation for the preference by wastewater engineers for centralised systems, nothing can be elicited clearly from the literature. Indeed as Beder (1993) has pointed out, the findings of the Royal Commission on Sewage Disposal in 1908 recommended neither water-based nor non-water-based systems as being inherently superior. Indeed Poore (1893), a doctor, has documented how the early widespread introduction of sewerage into Britian was responsible for hundreds of thousands of deaths, and Feachem and others (1980) have emphasised that the development of centralised systems to handle the effluent from water closets was very much a process of trial-and-error. One might speculate that had the effort to improve early centralised sewerage technology been applied instead to dry on-site systems, we would have had the present-day developments in composting toilets much earlier.

Why was preference given to centralised water-based systems? The only explanation I and some other wastewater engineers have hypothesised (independently of each other) is that centralised systems could justify the use of engineers, while with on-site systems, the cost of an engineer may frequently have appeared as disproportionately high.

There remains the argument in favour of centralised sewerage systems, that frequently on-site systems such as septic tanks and aerated water treatment systems do not work properly. However, this is normally not so much as an indictment of the on-site technologies as the regulatory systems.

A simple means of ensuring that on-site systems are working properly is to institute a system of licenses such as with motor vehicles. We could require all owners of on-site systems to renew their licenses every 3 to 5 years. One condition for renewal would be certification by an approved person such as a certified plumber.

If your team wishes to employ all available means to reduce pollution in these catchments, I would urge you to:-

- make mention of the benefits of composting toilets with separate greywater treatment systems;

- recommend that the current prohibition on using composting toilets in sewered areas be removed.

Yours faithfully,

Terry Lustig

Dr. Terry Lustig
Director

Encl. Brochures on composting toilets
Article in Owner Builder
Article in UNSW Tharunka Newspaper

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COMPARISON OF ON-SITE WASTE DISPOSAL SYSTEMS

	Septic Tank	Aerated Wastewater Treatment[1]	Composting Toilet with Greywater Treatment
Eliminates viruses?	No	Not necessarily	Yes
Eliminates bacteria?	No	Not necessarily	Yes
Can regrowth of bacteria occur after chlorination?	N/A	Yes	N/A
Eliminates beneficial bacteria?	No	Yes	No
Possible dissemination of infectious aerosols over large distances?	No	Yes	No
Eliminates protozoan cysts?	No	Unlikely	Yes
Eliminates helminths (worms)?	No	No	No. Eggs of roundworm may survive.
Creates trihalomethanes (reported to be carcinogenic)?	No	Yes	No
Risk to health during mechanical breakdown?	High	Moderate to high	Low
Can be left unattended for more than three months?	Yes	No	Yes
Requires maintenance contract?	No	Yes	No
Reduces sludge accumulation?	No	No	Yes
Approximate intervals between desludging by a pump-out contractor	1 to 4 years	6 months to 4 years	15 to 20 years
Requires chemicals?	No	Yes	No
Reduces discharge of phosphorus to the environment?	No	No	Yes
Reduces discharge of nitrogenous compounds to the environment?	A little	Yes	Yes
Saves water?	No	No	Yes

[1]Assumed to have chlorination and spray irrigation of effluent. Effectiveness of chlorination on destruction of pathogens taken from R.G. Feachem, D.J. Bradley, H. Garelick and D.D. Mara (1980) Health Aspects of Excreta and Sullage Management - A State-of-the-Art Review. World Bank, Washington.