PROPOSED INTEGRATED WASTE DISPOSAL FACILITY EASTERN GOLDFIELDS WESTERN AUSTRALIA

HEALTH DEPARTMENT OF WESTERN AUSTRALIA

Report and Recommendations of the Environmental Protection Authority

Environmental Protection Authority
Perth, Western Australia
Bulletin 353 September 1988

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ISSN 1030 - 0120

ISBN 0 7309 1862 9

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SUMMARY AND RECOMMENDATIONS

The Health Department of Western Australia proposes to establish an Integrated Waste Disposal Facility in the Eastern Goldfield Region. The facility would be owned and operated by the Health Department and only wastes generated in Western Australia would be accepted for disposal.

The proposal includes:

- a high temperature incinerator for the disposal of organochlorines, which at this stage include agricultural chemicals and polychlorinated biphenyls (PCB's); and

- an area for burial of intractable solid wastes which include low level radioactive wastes generated from the processing of phosphate rock and monazite.

The Health Department would own and operate the facility and would assume responsibility for collection of the waste from storage and transport to the waste disposal site. The actual transport of wastes would be managed by Westrail. The Health Department has proposed three areas in which to site the facility, two in the Shire of Coolgardie and one in the Shire of Yilgarn.

There is a need for an Integrated Waste Disposal Facility in Western Australia for a variety of reasons. Stockpiles of PCB's and other organochlorine chemicals pose a risk of environmental contamination. The mineral processing industry has the potential to produce low level radioactive waste which would require disposal in an environmentally acceptable manner. There is also a need to dispose of equipment which has become contaminated with radionuclides by the processing of phosphate rocks and mineral sands. These are currently being stockpiled.

The Environmental Protection Authority determined that a Public Environmental Report would be required to assess the proposal. The PER had a public review period of six weeks and then a second review period of three weeks closing 15 August 1988. The second review period accommodated a further alternative site for the proposal.

The major environmental issues associated with the proposal are the siting of the facility, the transport of the wastes to the facility, emissions from the incinerator, radiation levels, (both for workers and the environment), and the need for proper environmental management and monitoring.

All three sites satisfy the criteria for the disposal of low level radioactive waste. These criteria are more restrictive than the criteria for the incinerator. All three sites also have a sufficiently large buffer zone from human habitation and agricultural activities. Transport of the waste would comply with the appropriate regulations, but the proponent would be required to investigate, the transport of wastes, including emergency procedures and liaison with local communities. The emission from the incinerator would be monitored and are expected to be so low as to be insignificant. Radiation levels associated with the disposal of the low level radioactive waste are considered by the Authority to be manageable and the Health Department has made a commitment to comply with the ALARA principle, that is to keep radiation uses as low as reasonably achievable.

Accordingly, the Authority has concluded that the proposal is environmentally acceptable, and has made the following recommendations:

RECOMMENDATION 1

The Environmental Protection Authority concludes that the proposed Integrated Waste Disposal Facility is environmentally acceptable and recommends that it could proceed subject to the EPA's Recommendations in this report and the proponent abiding by the environmental commitments in the Public Environmental Report including (see Appendix A):

- **the operation will be controlled by the Health Department of Western Australia;**
- **the facility will be owned by the Health Department of Western Australia;**
- **wherever possible transport will be by rail;**
- **a monitoring programme will be implemented; and**
- **personnel will be trained in emergency response procedures.**

RECOMMENDATION 2

The Environmental Protection Authority recommends that the proponent drill the chosen site to confirm the absence of potable water and to confirm the depth of clay is in excess of 15 m and forward results to the EPA for review.

RECOMMENDATION 3

The Environmental Protection Authority recommends that prior to construction, the proponent undertaken biological surveys to indicate the impact of the facility on rare and endangered species to the satisfaction of the EPA.

RECOMMENDATION 4

The Environmental Protection Authority recommends that prior to construction, the proponent undertake a survey for Aboriginal sites to comply with the Aboriginal Heritage Act.

RECOMMENDATION 5

The Environmental Protection Authority recommends that prior to commissioning the proponent prepare an Environmental Management Programme to the satisfaction of the EPA, and that the EMP be available to members of the public. The EMP should address:

- size of the incinerator;
- operational procedures;
- transportation of the wastes;
- emergency procedures;

. radiation monitoring programme; and

. organochlorine monitoring programme.

RECOMMENDATION 6

The Environmental Protection Authority recommends that prior to commissioning the proponent undertakes the following for all stages of the transport operation to the satisfaction of the EPA and relevant Government agencies and that it be included in the Environmental Management Programme:

. establish detailed specifications for organochlorine loading, transfer and unloading areas;

. establish detailed specification for low level radioactive wastes loading transfer and unloading areas;

. outline specific safeguards for rail containers containing organochlorine and low level radioactive waste;

. detail plant site storage and handling requirements, including fire safety;

. identify responsibility for the various aspects of transport and transfer operations;

. prepare contingency plans for dealing with spillages should they occur; and

. liaise with the local communities over emergency procedures.

RECOMMENDATION 7

The Environmental Protection Authority recommends that the proponent should report the results of the monitoring programme to the EPA six monthly and that these results should be made available to the public.

RECOMMENDATION 8

The Environmental Protection Authority recommends prior to commissioning the proponent prepares a hazard and safety management strategy for the incinerator to the satisfaction of the EPA and relevant Government agencies.

RECOMMENDATION 9

The Environmental Protection Authority recommends that the disposal at the Integrated Waste Disposal Facility of any wastes other than those specified in the PER should be referred to the EPA for assessment.

1. INTRODUCTION

The Department of Health proposes to establish an Integrated Waste Disposal Facility in the Eastern Goldfield Region. The facility would be used to dispose of certain hazardous wastes generated in Western Australia.

The proposal includes:

- a high temperature incinerator for the disposal of organochlorine and other intractable wastes for which this is the optimum disposal method; and

- an area for burial of low level radioactive wastes arising from the processing of mineral sands and phosphate rock, and solid waste such as the transformers (after being cleaned of PCBs).

The Environmental Protection Authority discussed the proposal and decided that a Public Environmental Report should be prepared to allow public involvement in the assessment of the proposal. There were two public review period. The first six week review period was for the whole proposal. The second, three week review period finishing on August 1988, was to allow public comment on another alternative site for the facility.

The Environmental Protection Authority has determined that the proposal should be assessed in two parts:

- the disposal of liquid intractable wastes by incineration; and

- the disposal of solid intractable wastes by burial.

2. NEED FOR THE PROPOSAL

The proponent states in the PER that there is a requirement for the proposal for a number of reasons:

(1) Stockpiles of PCB's and other organochlorine chemicals which have been or are being withdrawn from industrial and agricultural use, require a long term environmentally acceptable management solution;

(2) ongoing production of intractable wastes require disposal by high temperature incineration; and

(3) the need to dispose of low-level radioactive wastes arising from the processing of mineral sands and phosphate rock.

Stockpiled organochlorines pose a risk of environmental contamination and occupational exposure. A low temperature storage fire could convert the organochlorines to dioxins which could be an exposure hazard for the community.

Ongoing production of intractable waste by industry would be stockpiled, and this pose a risk of environmental contamination unless disposal by high temperature incineration was available.

Low level radioactive wastes cannot be destroyed and require long term isolation and containment. Western Australia produces approximately 65% of the worlds monazite and so it seems probable that Western Australia will have downstream processing of monazite. Monazite is radioactive due to its

uranium and thorium content and wastes from processing monazite would also be radioactive. The Environmental Protection Authority has already approved one proposal by Allied Eneabba to treat monazite. An environmentally secure disposal site for the waste will be needed should any such plants be established. As well, Western Australia processes phosphate rock to produce fertiliser. The phosphate rock contains small amounts of radium which is concentrated in the fertiliser works. The old tanks, pipes and filter etc. become contaminated through absorption of the radionuclides. At present this discarded equipment is stored in a variety of places. As it is certain that fertiliser used will continue and as such radioactive equipment will continue to be produced, then it is necessary to provide a secure disposal site for such material.

The establishment of an integrated facility obviously offers the potential for considerable cost savings in terms of construction and operation. An integrated facility would also avoid the need for duplicated infrastructure such as electricity, water, road and rail, and for duplicated operational expenses in terms of personnel and some monitoring requirement.

3. PUBLIC AND GOVERNMENT SUBMISSIONS

The PER was released for public comment for a six week period from 21 May 1988 until 4 July 1988. In July the Health Department requested that the Environmental Protection Authority consider a third site. The Authority determined that public review period of three weeks on the final site was required. This review period period closed on the 15 August 1988. The submissions received from members of the public were of four differing formats:

Standard Submissions - members of the public signed a standard letter opposing the siting of a hazardous waste disposal facility in the Goldfields:

Semi-Standard Submissions - the letter format consisted of various combinations of 8-10 paragraphs, selected from a total of 68 paragraphs. Each paragraph identified one issue. Members of the public signed one or more of the letters which opposed the proposal:

Individual Submissions - individual responses; and

Petition - a petition organised by the group, GASP (Goldfields Against Serious Pollution).

	TOTAL	FOR	AGAINST	INFORMATION
Standard	783	0	783	-
Semi-Standard	1618	0	1618	-
Individual	45	3	42	-
Government	18	-	0	18
Local Government	5	-	3	2
Others	8	-	-	8
	2477	3	2446	28
Petition (signatures)	6500	0	6500	

Opposition to the Proposal

The majority of submissions received were opposed to the proposal and more specifically the siting of the facility in the Goldfields region. The submissions identified a range of issues and concerns, some of which were of a non-environmental nature.

The majority of the submissions addressed the disposal of radioactive wastes component of the proposal. Issues raised included the radiation hazard posed by the transport of the waste to the facility, the lack of detailed contingency planning in the event of an accidental spillage; and concern with respect to the long term storage of radioactive waste in terms of stability, security and safety aspects. Many people viewed the disposal of Western Australia waste only as a precursor for the facility being developed to dispose of Australian and international waste. The Rhone-Poulenc Rare Earths processing plant proposal and the present proposal were seen as intimately connected.

A number of submissions expressed concern regarding the nature and level of emissions from the incinerator and the lack of detail about the design specifications of the incinerator.

The overall lack of detail in the PER was also identified as limiting the degree to which the proposal could be assessed.

Support for the Proposal

Only three (3) submissions received supported the proposal, in principle. All identified areas requiring further consideration by the proponent, and in particular the hazards associated with the disposal of radioactive waste.

Government Submissions

Eighteen submission were received from a number of Government departments. Overall these submissions provided information, acknowledged the need for such a facility and supported the concept of the proposal detailed in the PER.

A summary and review of the submissions is presented in Appendix B; and the proponent's responses to these issues are presented in Appendix C.

4. PROJECT DESCRIPTION OF THE LAND DISPOSAL OF SOLID INTRACTABLE WASTES

4.1 WASTES

4.1.1 RARE EARTH WASTES

Monazite occurs as a minor component of mineral sands which are mined in Western Australia. It consists of 60% rare earth oxides, 7% thorium, 0.2% uranium and 33% gangue, which includes phosphorus. Western Australia produces approximately 66% of the world's monazite. Monazite can be treated to produce rare earth salts and an insoluble thorium hydroxide waste is produced in the process. The thorium hydroxide wastes consist of 14% thorium, 40% water, some uranium and other impurities. Should all the Monazite currently produced in Western Australia be processed approximately 8000 tonnes per annum of thorium waste would be produced. This waste would require an environmentally secure disposal site.

4.1.2 OTHER LOW LEVEL RADIOACTIVE WASTES

During the processing of mineral sands and phosphate refining, the minerals are subject to various physical and chemical processes which separate the radioactive isotopes. Components of the processing plants such as, reaction vessel, linings, pipes and filter parts become contaminated with a surface deposit of radioactive substances. The main contaminant is radium. It is generally considered safer to discard these components after a reasonable service life than to expose workers to radiation risks to decontaminate them. Plant components of this nature have been held in storage for many years in Western Australia. They cannot be stored indefinitely on the sites of fertiliser works without posing a risk of contamination.

4.1.3 OTHER INTRACTABLE WASTES

The solid wastes from the incinerator, consisting of metal containers and the shells of capacitors would require disposal by burial. In the future, Western Australian industry, research and medicine will produce small amounts of solid intractable wastes such as spent catalysts. The Health Department may propose that such wastes should be disposed of at the Integrated Waste Disposal Facility. This will require separate assessment by the EPA.

4.2 SITE SELECTION

The Health Department has presented three areas for assessment. The site for the facility would be located inside one of the areas.

AREA 1	
Shire	Yilgarn
Land Use	Vacant Crown Land
Area	Approximately 150 km^2
Distance from Koolyanobbing	20-40 km NE
Distance from Southern Cross	70-90 km
Distance from railway	15 km
Elevation	460 m AHD
Gradient	Flat

AREA 2	
Shire	Coolgardie
Land Use	Vacant Crown Land
Area	30 km^2

AREA 2 (cont'd)	
Distance from Coolgardie	70 km
Distance from Bullabulling	45 km
Distance from Koolyanobbing	75 km
Distance from Walleroo Siding	16 km
Distance from Railway	5 km
Distance from Southern Cross	100 km
Elevation	456 m AHD
Gradient	Flat

AREA 3	
Shire	Coolgardie
Land Use	Vacant Crown Land
Area	50 km^2
Distance from Coolgardie	115 km
Distance from Koolyanobbing	80 km
Distance from Railway Line.	60 km
Elevation	450-500 m AHD
Gradient	Flat to gently undulating

4.2.1 GEOLOGY

The main criterion to be met for the disposal of low-level radioactive wastes is that the area is geologically stable. This criterion is paramount as the wastes will remain radioactive, albeit at a low level for an extremely long time. Such stability is afforded by the Yilgarn Block which covers much of the southern part of Western Australia. All three sites are located in the Yilgarn Block. This region comprises of a massive thickness of granite with generally low seismic activity.

4.2.2 TOPOGRAPHY

All three sites are located on plateaux between drainage systems.

4.2.3 HYDROGEOLOGY

The region is typically underlain in parts by hypersaline groundwater which is unlikely to be exploited for domestic or agricultural use. The only major use for the water in the goldfield region is for gold processing. The waste disposal sites are all relatively distant from local sites of potential gold mineralisation. Reconnaissance drilling in site 1 did not locate any significant occurrence of groundwater. Drilling at site 3 indicated that there was no retrievable water to a depth of 40 metres when granite bed rock was reached. Site 2 has yet to be drilled.

4.2.4 SOILS

The surface of the plateaux comprises a mixture of laterite and sandplain.

4.2.5 BIOLOGICAL ENVIRONMENT

The area required for the integrated waste disposal facility is small, approximately 5 km^2, relative to the total suitable area available as described in Section 4.2. It is unlikely that the facility would have a major impact on the flora and fauna.

4.2.6 LAND USE

Sites 1, 2, and 3 are all located on Vacant Crown Land, and so conflict with any current land use is not expected. None of the sites is known to have mineral or agricultural significance or potential. They are also not known to be important to aboriginal communities. Each site has an adequate buffer zone from agricultural and permanently inhabitated areas.

4.3 ASSESSMENT OF WASTE PROPOSED FOR BURIAL

Health Department Officers would consult with the waste producer and other Government Authorities and experts to produce specifications for the conditioning and packaging of wastes. The waste producer will then condition and package the wastes to appropriate standards.

4.4 TRANSPORT OF WASTE

After appropriate packaging the waste would be loaded into ISO - freight containers by means which would minimise operator radiation exposure. Filled transport containers can easily be transferred to road or rail vehicles by gantry crane or other mechanical means. Remote loading and unloading of containers from the vehicles would occur.

Consignment would be managed by Westrail.

Waste packaged in ISO -freight containers would be transported by rail to a dedicated siding at either Koolyanobbing or Jaurdi. The ISO - freight containers would then be transferred to road trucks for transport to the Integrated Waste Disposal Facility on a private road. Transfer from rail to road vehicle and from road vehicle to the ground at the Integrated Waste Disposal Facility would be by purpose built transfer crane, attached to the truck.

ISO - freight containers would be transported by rail from Pinjarra through Mundijong, Wellard, Kwinana, and Canning Vale to Kewdale. There it would be transferred onto the main East-West railway line to either Koolyanobbing or

Jaurdi Road transport would be used to transfer the ISO - freight container to the Facility.

4.5 WASTE DISPOSAL

Solid Intractable Waste would be disposed of by shallow burial beneath the ground surface in a series of trenches.

(1) Separate trenches would be used for different categories and types of solid waste.

(2) Trenches would be progressively back filled.

(3) Trench location would be surveyed, designated and marked on the ground and on the detailed site diagram.

(4) Earth moving equipment would dig the trench.

(5) Bottom of the trench would be compacted to the engineering design criterion.

(6) Wastes would be transferred from the ISO - freight container into the trench as solid packages using a boom crane or similar remote handling technique to ensure distance protection from radioactive wastes for operator radiation protection. Waste packages would be stacked in an orderly manner to provide minimum scope for future subsidence or movement.

(7) Records would be entered of the exact location of each package of waste in the trench.

(8) After wastes have been stacked to the appropriate height in the trench, they would be covered with excavated clay to the detailed engineering specification. This clay cover would be compacted and domed to divert any rain infiltration towards the sides.

(9) According to the detailed engineering design, a layer of rock may be placed upon the compacted clay cover to further reduce the likelihood of erosion.

(10) A further layer of clay would be compacted and domed over the rock layer if specified in the detailed engineering design.

(11) The excavated sand cover would be returned, shaped to aid drainage according to the detailed engineering design and be revegetated with native vegetation.

(12) Appropriate rock/cement markers would be erected to identify the filled trench.

5. ENVIRONMENTAL MANAGEMENT AND MONITORING

5.1 MANAGEMENT OF THE OPERATIONS

The Health Department would establish a Central Committee for the facility which would include local representatives. This Committee would oversee the project through the design, commissioning and operational phases and would issue a site operating licence.

9he Health Department would establish a separate Community Liaison Committee which would provide local residents with information on the operation of the facility. It is envisaged that the Committee will consist of, amongst others, representative of Shire Officers, elected Councillors, local residents and appropriate government officers.

A suitably qualified safety officer would be appointed to supervise operations at the disposal facility.

The development of the facility would be in accordance with the principle of minimising the impact on the natural environment. This would involve minimising clearing and revegetation of disturbed areas such as the filled burial trenches.

5.2 MONITORING

Baseline radiation monitoring would be conducted once a final site has been selected. The measurements would include:

- gamma radiation levels;
- airborne dust concentration;
- alpha/beta activities;
- groundwater concentration of thorium, uranium radium 226 and radium 228;
- radon, radon daughter, thorium, thorium daughter concentration in air; and
- radon and thorium emanation rates from the ground.

Gamma emissions from freight containers would be measured during the commissioning phase of any monazite processing plant and monitoring would continue for the duration of the project.

A radiation monitoring programme would be designed for the operational phase of the Integrated Waste Disposal Facility.

6. PROJECT DESCRIPTION FOR INCINERATION OF LIQUID INTRACTABLE WASTES

6.1 BACKGROUND

The Authority has previously assessed a proposal to construct a PCB incinerator, to be located near Koolyanobbing (EPA Bulletin 297, September 1987). That proposal consisted of a high temperature incinerator and associated infrastructure which was capable of incinerating all of Western Australia's PCB wastes (estimated at approximately 1000 tonnes) over a period of three to five years. The incinerator was to take only PCB wastes which were generated in Western Australia.

6.2 FURTHER DEVELOPMENTS

A number of developments have occurred recently to warrant the current proposal for an integrated waste facility. The liquid intractable waste stream has expanded from PCBs to include other organochlorine wastes. These include the agricultural pesticides which were recalled in a buy-back programme organised by the Department of Agriculture in 1987. The total

quantity of DDT, dieldrin, aldrin, chlordane and heptachlor received amounted to approximately 180 tonnes. The Department of Agriculture currently has these materials stored in dedicated storage areas located at three agricultural research stations. These materials can also be safely destroyed by high-temperature incineration.

Proposed industrial development is also creating a need for on-going disposal of intractable wastes. The petrochemical plant proposed by Petrochemical Industries Company Limited (PICL) which was assessed by the Authority in April 1988 (EPA Bulletin 331) has the potential to generate significant quantities of chlorinated hydrocarbon wastes. The Authority noted that the plant had the potential to produce chlorinated aromatic wastes, which were likely to represent the most serious environmental contaminants in PICL's chlorinated hydrocarbon waste stream.

These chlorinated aromatics consist principally of monochlorobenzene, with the potential for other chlorinated benzenes up to hexachlorobenzene (HCB). The likelihood of PCBs being present in the waste stream is extremely low. Further information provided by PICL indicates that monochlorobenzene is the only chlorinated aromatic of any consequence in the waste stream (approximately 230 tonnes per annum). Should provision be made for incineration off-site of this waste stream, then expansion of the capacity of the incinerator would have to be allowed for. In addition, it is envisaged that small quantities of various tarry wastes from PICL would have to be destroyed in the incinerator. The Environmental Protection Authority has recommended that an Environmental Management Programme should be prepared for PICL wastes.

Moreover, there is the potential for other industrial projects which may be proposed in the future to generate intractable wastes requiring high temperature incineration.

Hence, there is a need for a facility which would destroy not only the PCBs in Western Australia, but service the on-going needs of the State. Consequently, although the initial capacity of the plant may be limited, it should have the capacity for expansion to an appropriate level in the future. All proposals for additional waste will be publicly assessed by the Authority.

6.3 THE PROPOSAL

A description of the proposed incinerator is provided in the PER. In summary, this consists of the following:

- an unloading area for the receival of wastes including facilities for the receival and unloading, and facilities for the preparation of organochlorines for transfer to the incinerator;

- storage tanks and drum storage area. An area for the storage of capacitors awaiting disposal would also be provided;

- high temperature incinerator system including feed system, primary and secondary combustion chambers with associated controls;

- air pollution control system - ie either a wet venturi scrubber system or a dry lime reactor for particulate removal and for gas scrubbing;

- evaporation ponds for the disposal of scrubber water;

. a residue treatment and disposal system;

. process control; and

. support services infrastructure, administration and amenity buildings.

The actual incinerator site would be approximately one hectare, surrounded by a separate security fence.

The initial capacity of the proposed incinerator would be 300 tonnes per year of liquid and solid wastes, with a proposed feed rate of 1-2 tonnes per day. The facility would not have a defined life span.

Other aspects of the proposal include:

. PCBs collected from different parts of the State would be transported by road to central interim storage facilities in Perth;

. the proponent would make use of the central collection and interim storage facilities in the metropolitan area with subsequent bulk conveyance of organochlorines to the disposal site so as to meet the long-term collection timetable and the need to avoid storage of wastes on-site at the disposal facility;

. organochlorines would be handled and transported in purpose-built steel containers which would be safely sealed; and

. there would be a single storage, handling and transport agency throughout the disposal operation.

Non-PCB organochlorine wastes would be transported from their source sites in purpose built containers.

Rail transport will be used wherever feasible.

7. ENVIRONMENTAL ASSESSMENT OF INTRACTABLE WASTES

The major environmental issues associated with the proposal are:

. the siting of the facility;

. actual disposal of the wastes, solid waste and organochlorines;

. transport of wastes to the facility; and

. radiation levels.

7.1 SITE SELECTION

The selection of a suitable site for the facility requires that the site fit the selection criteria for shallow ground disposal of low level radioactive waste. These selection criteria are more restrictive than those for an incinerator facility alone. Site selection criteria are detailed in the reports of the International Atomic Energy Agency (1976,1981,1987) and the Australian Atomic Energy Commission. The general criteria include:

. geological stability;

. uniformity of rock type;

. deep weathered profile;

. low rainfall ;

. high evaporation rate;

. absence of groundwater or groundwater generally unusable;

. minimum depth to any groundwater 10 m;

. appropriate site drainage;

. suitable soil type;

. adequate buffer zone from areas of human inhabitation and agricultural production;

. absence of mineralisation;

. absence of aboriginal sites or areas of environmental significance.

All three sites proposed by the Health Department could meet the above criteria. They are all in a geologically stable area on the Yilgarn Block. There is an adequate buffer zone to areas of human inhabitation and agricultural production. They are in a low rainfall high evaporation area. There is uniformity of rock type, deep weathered profile, suitable soil types and appropriate drainage. Sites 1 and 3 have been drilled and have a suitable depth of clay and the an absence of usable groundwater. The Health Department would be required before final approval to investigate the mineralisation of the selected site, conduct a survey for aboriginal sites and also undertake a biological survey to identify rare or endangered species. Should site 2 be chosen as the site for the facility then the Health Department would be required to drill to confirm the absence of usuable water and the depth of suitable soils before final approval of the site.

7.2 BURIAL OF THE WASTE

The essential criteria for safe disposal of intractable solids are that they need to be buried such that:

(a) they remain in a stable physical and chemical form;

(b) they do not interact or react with themselves or with adjacent wastes; and

(c) they remain isolated from the environment.

Immobilisation of intractable wastes and inhibition of their migratory path way is achieved by:

. conditioning wastes; and

. burying them in an appropriate sited and operated repository.

The Health Department proposal meets the essential criteria for safe disposal of solid wastes. The waste would remain in a stable physical and chemical form and they would not interact with themselves. Neither would

they interact with adjacent wastes as separate trenches would be used for different types of waste. The Health Department has made a commitment to fill the trenches and design the trenches and covering to prevent erosion. This should allow the waste to remain isolated from the environment.

7.3 ALTERNATIVE DISPOSAL OPTIONS FOR THE HIGH TEMPERATURE INCINERATOR

There are approximately 1000 tonnes of PCB waste stored in Western Australia. Stored PCBs can be spilt and leakages can occur from containers. In addition low temperature fires can result in toxic products being formed. The Environmental Protection Authority considers that the consequences of indefinite storage of these wastes and other organochlorine wastes in the State is environmentally undesirable.

The Environmental Protection Authority had already assessed the various disposal options for PCBs (Bulletin 297) and came to the conclusion that high temperature incinerator is technically and environmentally the most acceptable method for disposing of Western Australian PCBs. A chemical process for the destruction of organochlorine compounds is currently being investigated at the University of Sydney. This is still at the early research stage and may not be applicable to all situations. Therefore, the EPA still considers high temperature incineration environmentally the most acceptable method for disposing of Western Australia organochlorines.

7.4 SAFETY ASPECTS OF HIGH TEMPERATURE INCINERATOR

As discussed earlier, the destruction of intractable organochlorine needs to be carried out in a manner so as to minimise the potential hazards and maximise the safety of the disposal facility. The major safety issue associated with the incinerator is the storage and destruction of organochlorines and the possibility of the loss of containment of organochlorines and associated compounds from the incineration facility.

The Authority notes that there are over 20 such high temperature incinerator facilities in at least eight countries (mostly in Europe) and that all of these facilities are significantly larger than the incinerator proposed for the Koolyanobbing area. Many of these overseas facilities are located in close proximity to residential areas (some within 500 metres), and have been operating for more than ten years.

All three sites proposed in the PER would have a minimum of 20 kilometres from the nearest permanent habitation.

However, the Authority does not consider that having an adequate buffer zone is sufficient. In its assessment, the Authority has examined in detail the proposed safeguards within the facility. In principle, the Authority considers that the safeguards for this incinerator should be appropriate and adequate to site such a facility within an industrial area in the metropolitan region.

In order to achieve this objective, the Health Department has provided the following safeguards to ensure that the highest standards of safety would be implemented at the proposed incineration facility including:

- storage, handling and transport of wastes would be carried out only by properly trained and fully qualified operators;

- waste unloading and preparation for incineration would be automated as far as economically possible to minimise chances of worker exposure;

- equipment would be provided in the incinerator unloading area to contain spills and to remove excessive levels of vapours from sealed containers.;

- liquids awaiting incineration would be stored in a liquids tank farm that will provide full fire control, spillage containment and vapour control for all waste liquids stored;

- containers such as capacitors would be drained and prepared for treatment in the incinerator using automatic equipment;

- waste feed to the incinerator would be achieved by positive displacement metered pumping through an atomising lance for liquids and by a ram feed into an air lock for solids;

- the primary and secondary combustion chambers would be operated at 15 mm negative pressure to control fugitive emissions with facility to vary solids retention times and to achieve specified minimum temperatures, gas retention times and excess oxygen content in the flue gas;

- an air pollution control system using either a wet or dry scrubber system would be installed to limit particulate and gaseous emissions to acceptable levels; and

- a combination of automatic and manual controls would be used to monitor and control the system.

The EPA is satisfied that the Health Department of Western Australia's commitments on the safety aspects demonstrate that a safe and viable incineration facility can be built and maintained.

For the previous assessment (Bulletin 297) the proponent provided a fault identification and management programme which outlines the contingency and prevention measures to manage possible faults or accidents which could occur. In addition the proponent has outlined a detailed set of commitments (see Appendix A) to manage the safety requirements for the incinerator.

The EPA also notes that the proponent, as part of a Safety Management Strategy, would be undertaking the following:

- a Hazard and Operability (HAZOP) study for the plant;

- a fire safety study for the site; and

- a study of emergency procedures before the commissioning of the plant.

The Authority considers that the above safety management strategy is appropriate. The details of this safety strategy would need to be approved by the EPA and relevant Government agencies.

The EPA considers that with the implementation of the proponent's proposed safeguards (as outlined in Appendix A) and with the plant being operated by the Health Department, the safety issues associated with the plant would be managed to the satisfaction of the Environmental Protection Authority. In addition, the EPA would be undertaking periodic auditing of the facility to ensure that safety requirements are maintained.

7.5 ENVIRONMENTAL IMPACTS DUE TO THE EMISSIONS OF WASTES

The PER identified a number of waste products being generated from the plant which would require treatment and/or disposal. These include:

. atmospheric emissions;

. liquid wastes; and

. solid wastes.

7.5.1 ATMOSPHERIC EMISSIONS

The PER states that the atmospheric emissions would be treated through an air pollution control device. The options proposed are:

. wet venturi scrubber; and

. dry lime reactor.

Implementation of the proposal would require a Works Approval for a construction under the Environmental Protection Act 1986. The EPA considers that the matter of the appropriate air pollution control technology and its efficiency should be resolved at the works approval stage.

7.5.2 LIQUID WASTES

Under the assumption that a wet venturi scrubber system would be employed (as it is in most other incinerators in Europe) the proponent states that liquid waste from the scrubbers would be stored in lined ponds. A subsequent commitment by the proponent entails the destruction of any wastewater contaminated with organochlorines, either from scrubber water, stormwater runoff or from in-plant spillages, through incineration within the facility. Other relevant commitments made by the proponent, are as below:

. aqueous residues would be contained and evaporated. Regular testing would be carried out; and

. on-site liquid wastes would be fully contained and generally disposed of by evaporation unless they result from spillage in which case they would be fed into the incinerator.

The Authority notes that no contaminated wastewater would be discharged off-site under any circumstances.

7.5.3 SOLID WASTES FROM THE INCINERATOR

Solid residues would consist of metal containers such as drums and the shells of capacitors after these have passed through the incinerator. They will be disposed of by landfill. This is addressed under solid intractable waste disposal (Section 4.1.3) of this report. The Health Department has made the following comments regarding the waste:

. solid residues including remnants of burnt waste containers and residue from evaporation ponds would be disposed of as landfill. Monitoring of leachates would be carried out to ensue no pollution occurs from this waste; and

. contamination by organochlorines in all solid waste from the incinerator would be less than 2 ppm, which is well below allowable levels in the United States of America.

7.6 TRANSPORT

7.6.1 SOLID INTRACTABLE WASTES

The proposed transport route for the low level radioactive waste passes through suburbs, country towns and agricultural areas, and is of concern to the local community.

There are two major concerns associated with the transport of radioactive waste are accidents and radiation levels.

The transport of radioactive wastes is covered by the requirements of the Radiation Safety (Transport of Radioactive Substances) regulations 1982 administered by the Radiological Council. These regulations incorporate the Code of Practice for the Safe Transport of Radioactive Substances 1982. This Code recognises that accidents will occur. Packaging and transport standards are specified to minimise any impact on personnel, the public and the environment when an accident occurs.

The Western Australian Road Transport Emergency Assistance Scheme (WATERS) is already in existence and has been extended to include rail transport. Contingency plans will be further extended to include emergency responses appropriate to all wastes consigned to the Integrated Waste Disposal Facility. The proponent has made a commitment to train emergency response personnel before consignment of the first freight containers of waste.

7.6.2 ORGANOCHLORINES

It is proposed to collect PCBs from different parts of the State and transport them to one or more central interim storage facilities in Perth. The PCBs and other organochlorines would then be transported by rail to Jaurdi or Koolyanobbing and then trucked to site.

The Health Department has made the following commitments with regard to ensuring a safe transport operation:

. storage, handling and transport of wastes would be carried out only by properly trained and fully qualified operators;

. wherever possible, transportation of waste would be by rail;

. organochlorine wastes would be tested before transport to the disposal facility to allow optimum incineration control for each type of waste;

. all wastes consigned for transport would be in double containment;

The Authority considers that the transport of organochlorines would be to be undertaken in a manner which minimises the likelihood of spillages. The proponent would need to prepare emergency plans for any contingencies.

7.7 RADIOLOGICAL ISSUES

The radiological issues occur at each stage of the operation.

7.7.1 TRANSPORT

As noted earlier the transport of radioactive waste is covered by the requirements of the Radiation Safety (Transport of Radioactive Substance) Regulation, 1982, administered by the Radiological Council.

Radiation doses to transport workers would be kept to a minimum by providing distance between them and the wastes. This distance would be achieved by using cranes and gantry cranes for loading and unloading the wastes and also providing remote locking and unlocking facilities.

7.7.2 DISPOSAL

The disposal method and sites meet the criteria for the isolating of the low level radioactive waste from the environment. After disposal the gamma flux from the waste at the ground surface would not be detectable above background. The Health Department has also made a commitment to keep workers radiation doses to less than 10 milli sieverts per annum and to conform to the ALARA principle of keeping radiation doses as low as reasonable achievable.

Protective clothing would be applied to the workers by the Health Department and laundered on site. Personal radiation monitoring would be carried out. A radiation safety officer would be appointed. Workers would be required to shower and change in the abultion facilities provided at the end of shift.

The combinations of these commitments would make the radiation aspects of the proposal manageable.

7.8 OCCUPATIONAL HEALTH ISSUES

The responsibility for reviewing occupational health issues within the plant rests with the Commission for Occupational Health Safety and Welfare. The Authority notes that the proponent has made a number of commitments regarding the occupational health matters. Accordingly, the Authority, considers that the proponent needs to liaise with the Commission on these issues.

8. CONCLUSION

The Environmental Protection Authority has concluded that the proposed Integrated Waste Disposal Facility would be environmentally acceptable, subject to the following recommendations:

RECOMMENDATION 1

The Environmental Protection Authority concludes that the proposed Integrated Waste Disposal Facility is environmentally acceptable and recommends that it could proceed subject to the EPA's Recommendations in this report and the proponent abiding by the environmental commitments in the Public Environmental Report including (see Appendix A):

- the operation will be controlled by the Health Department of Western Australia;
- the facility will be owned by the Health Department of Western Australia;
- wherever possible transport will be by rail;

. a monitoring programme will be implemented; and

. personnel will be trained in emergency response procedures.

The Authority assessed all three sites and concluded that all sites were in principle suitable for the disposal of solid intractable wastes and the siting of a high temperature incinerator. However, there would be a requirement for further investigation of the chosen site to confirm the depth of clay and the absence of potable groundwater.

RECOMMENDATION 2

The Environmental Protection Authority recommends that the proponent drill the chosen site to confirm the absence of potable water and to confirm the depth of clay is in excess of 15 m and forward results to the EPA for review.

The Health Department would also have to undertake a survey of the vegetation, flora and fauna, and Aboriginal sites at the chosen site.

RECOMMENDATION 3

The Environmental Protection Authority recommends that prior to construction, the proponent undertaken biological surveys to indicate the impact of the facility on rare and endangered species to the satisfaction of the EPA.

RECOMMENDATION 4

The Environmental Protection Authority recommends that prior to construction, the proponent undertake a survey for Aboriginal sites to comply with the Aboriginal Heritage Act.

RECOMMENDATION 5

The Environmental Protection Authority recommends that prior to commissioning the proponent prepare an Environmental Management Programme to the satisfaction of the EPA, and that the EMP be available to members of the public. The EMP should address:

. size of the incinerator;

. operational procedures;

. transportation of the wastes;

. emergency procedures;

. radiation monitoring programme; and

. organochlorine monitoring programme.

RECOMMENDATION 6

The Environmental Protection Authority recommends that prior to commissioning the proponent undertakes the following for all stages of the

transport operation to the satisfaction of the EPA and relevant Government agencies and that it be included in the Environmental Management Programme:

- establish detailed specifications for organochlorine loading, transfer and unloading areas;
- establish detailed specification for low level radioactive wastes loading transfer and unloading areas;
- outline specific safeguards for rail containers containing organochlorine and low level radioactive waste;
- detail plant site storage and handling requirements, including fire safety;
- identify responsibility for the various aspects of transport and transfer operations;
- prepare contingency plans for dealing with spillages should they occur; and
- liaise with the local communities over emergency procedures.

RECOMMENDATION 7

The Environmental Protection Authority recommends that the proponent should report the results of the monitoring programme to the EPA six monthly and that these results should be made available to the public.

RECOMMENDATION 8

The Environmental Protection Authority recommends prior to commissioning the proponent prepares a hazard and safety management strategy for the incinerator to the satisfaction of the EPA and relevant Government agencies.

RECOMMENDATION 9

The Environmental Protection Authority recommends that the disposal at the Integrated Waste Disposal Facility of any wastes other than those specified in the PER should be referred to the EPA for assessment.

9. REFERENCES

Environmental Protection Authority (1987), Western Australian PCB Incineration Facility near Koolyanobbing. Health Department of Western Australia. Report and Recommendations of the Environmental Protection Authority, Bulletin 297.

Environmental Protection Authority (1987), Proposed Integrated Petrochemical Complex at Kwinana. Petrochemical Industries Company Limited. Report and Recommendations by the Environmental Protection Authority, Bulletin 331.

International Atomic Energy Agency Reports (1976), Management of Wastes from the Mining and Milling of Uranium and Thorium Area Safety Series No 44.

International Atomic Energy Agency Reports (1981), Shallow Grand Disposal of Radiaction Wastes Safety Series No 53.

International Atomic Energy Agency (1982), Site Investigated for Repositories for Solid Radioactive Wastes in Shallow Ground. Technical Report Series No 216.

APPENDIX A

SUMMARY OF COMMITMENTS

The Health Department makes the following commitments relating to this proposal to establish an integrated hazardous waste disposal facility.

- The entire operation will be controlled by the Health Department of WA.
- The facility will be owned and operated by the Health Department of W.A.
- The facility will only be used for wastes generated in Western Australia.
- Biological and archaeological site surveys will be undertaken prior to final selection of a site for the facility.
- Site management will include the provision of fencing and signposting around the site, to discourage access by fauna and unauthorised personnel.
- Construction activities at the plant site will be undertaken in accordance with statutory requirements, and appropriate management techniques will be implemented to ensure that noise and dust levels are acceptable.
- Storage, handling and transport of wastes will be carried out only by properly trained and fully qualified operators.
- Wherever possible, transportation of waste will be by rail.
- Organochlorine wastes will be tested before transport to the disposal facility to allow optimum incineration control for each type of waste.
- All wastes consigned for transport will be in double containment.
- Waste unloading and preparation for incineration will be automated as far as economically possible to minimise chances of worker exposure.
- Equipment will be provided in the incinerator unloading area to contain spills and to remove excessive levels of vapours from sealed containers.
- Liquids awaiting incineration will be stored in a liquids tank farm that will provide full fire control, spillage containment and vapour control for all waste liquids stored.
- Containers such as capacitors will be drained and prepared for treatment in the incinerator using automatic equipment.
- Waste feed to the incinerator will be achieved by positive displacement metered pumping through an atomising lance for liquids and by a ram feed into an air lock for solids.

- The primary and secondary combustion chambers will be operated at 15mm negative pressure to control fugitive emissions with facility to vary solids retention times and to achieve specified minimum temperatures, gas retention times and excess oxygen content in the flue gas.

- An air pollution control system using either a wet or dry scrubber system will be installed to limit particulate and gaseous emissions to acceptable levels.

- A combination of automatic and manual controls will be used to monitor and control the system.

- Gaseous residues will be disposed of by enhanced atmospheric dispersion.

- Aqueous residues will be contained and evaporated. Regular testing will be carried out.

- Solid residues will be disposed of as landfill on-site.

- Provision for emergency services will include firewater supply, foam dousing (or similar) in flammable liquid storage areas, firebreaks, emergency washing facilities, visual and audible alarms and contingency planning.

- Specific emergency contingency planning will be implemented prior to the commencement of waste transport and disposal.

- Standards set by United States agencies for incinerator efficiency will be adopted for the proposed disposal facility, these being that the Destruction and Removal Efficiency of the incinerator will be not less than 99.9999% and that the combustion efficiency will be not less than 99.9%.

- Other standards for residues from PCB incineration will be as prescribed by the Environmental Protection Authority.

- The standard for organochlorine levels in the workplace set by the US national regulatory authorities will apply.

- Ground level concentrations of organochlorines will not exceed prescribed levels.

- Contamination in all solid waste from the incinerator will be less than 2ppm which is well below allowable levels in the United States.

- On-site liquid wastes will be fully contained and generally disposed of by evaporation unless they result from spillage in which case they will be fed into the incinerator.

- Solid residues including remnants of burnt waste containers and residue from evaporation ponds will be disposed of as landfill. Monitoring of leachates will be carried out to ensure no pollution occurs from this waste.

- A monitoring programme will be implemented involving continuous and intermittent sampling, testing and monitoring of plant operating conditions together with soil and leaf sampling and testing from around the incinerator site.

- The Department of Occupational Health, Safety and Welfare will be asked to assist the Health Department to develop comprehensive guidelines for safe handling of waste during storage, transport and destruction operations and to specify first aid provisions for all personnel.

- All personnel involved in the handling of wastes will be specifically trained in safety and emergency response procedures. This training will be coordinated by the Health Department in association with the Department of Occupational Health, Safety and Welfare, Department of Mines, Radiation Health Branch, Westrail, EPA and the Trades and Labour Council of W.A.

- A thorough medical surveillance programme will be provided to give baseline and progressive personal health data throughout and beyond the employment period for each worker.

- First aid and hygiene measures will be provided at the disposal facility.

- The need for full protective clothing during normal operations will be evaluated just prior to the time that the facility becomes operational. Sufficient protective clothing will be provided at the site to cover emergency situations.

- Noise levels in the disposal plant will comply with the Noise Abatement (Hearing Conservation in Workplaces) Regulations, 1983.

- The requirements of the Commonwealth Code of Practice on Radiation Protection in the Mining and Milling of Radioactive Ores 1987 and of other relevant current and future Codes of Practice dealing with radioactive wastes will be met.

- A baseline radiation survey will be carried out at the disposal facility when site selection is completed.

- Airborne dust concentrations, AMAD where applicable and alpha and beta activities will be measured.

- A comprehensive radiation monitoring and health surveillance programme will be implemented.

- ICRP annual dose limits will not be exceeded and all radiation exposures will be kept as low as reasonably achievable, economic and social factors being taken into account. Designated worker annual radiation doses will not exceed 25 millisievert per year.

- Radiation protection assessments given in this PER for containerised wastes will be verified before use of such containers.

- Monitoring of radiation levels will continue over the life of the project.

- The Health Department will prepare annual reports for Parliament and for an initial five year period, for submission to the EPA, on the environmental management and monitoring commitments given in this document.

- The Health Department will initiate and co-ordinate a Control Committee to oversee the design, commissioning and operation of the facility. This Committee will include local representatives in its membership.

- The Health Department will initiate and co-ordinate a Community Liaison Committee to provide local residents with information on the operation of the facility.

APPENDIX B

REVIEW AND SUMMARY OF SUBMISSIONS FOR THE PROPOSED INTEGRATED HAZARDOUS WASTE DISPOSAL FACILITY

SUMMARY

PUBLIC SUBMISSIONS

The PER was released for public comment for a six week period from 21 May 1988 until 4 July 1988. The submissions received from the public were of four differing formats:

Standard submissions - members of the public signed a standard letter opposing the siting of a hazardous waste disposal facility in the Goldfields;

Semi-Standard Submissions - the letter format consisted of various combinations of 8-10 paragraphs, selected from a total of 68 paragraphs. Each paragraph identified one issue. Members of the public signed one or more of the letters which opposed the proposal;

Individual Submissions - individual responses;

Petition - a petition organized by the GASP (Goldfields Against Serious Pollution) group.

	TOTAL	FOR	AGAINST	INFORMATION
Standard	783	0	783	-
Semi-Standard	1618	0	1618	-
Individual	45	3	42	-
Government	18	-	0	18
Local Government	5	-	3	2
Others	8	-	-	8
	2477	3	2446	28
Petition (signatures)	6500	0	6500	

Opposition to the Proposal

The majority of submissions received were opposed to the proposal and more specifically the siting of the facility in the Goldfields region. The submissions identified a range of issues and concerns, many of which were emotively expressed and of a non environmental nature.

The majority of the submissions addressed the disposal of radioactive wastes component of the proposal. Issues included the radiation hazard posed by the transport of the waste to the facility, the lack of detailed contingency planning in the event of an accidental spillage and concern with respect to the long term storage of radioactive waste in terms of stability, security and safety aspects. Many people viewed the disposal of WA waste only as a precursor for the facility being developed to dispose of Australian and International waste. The Rhone-Poulenc Rare Earths processing plant proposal and the present proposal were seen as intimately involved.

A number of submissions expressed concern regarding the nature and level of emissions from the incinerator and the lack of detail about the design specifications of the incinerator.

The overall lack of detail of the PER was also identified as limiting the degree to which the proposal could be assessed.

Support for the Proposal

Only three (3) submissions received supported the proposal, in concept. All identified areas requiring further consideration by the proponent, and in particular the hazards associated with the disposal of radioactive waste.

GOVERNMENT AND OTHERS

Submissions (31 in total) were received from a number of Government Departments (18), Local Government Authorities (5) and interested groups and individuals (8). Overall the submissions acknowledged the need for such a facility to dispose of intractable wastes and supported the concept of the proposal detailed in the PER, with the exception of three (3) local government submissions which opposed the proposal.

All the submissions received identified areas where insufficient detail was provided (eg site selection, plant design, waste conditioning) and issues to which further attention needs to be addressed (eg transportation of radioactive material).

REVIEW OF SUBMISSIONS

Presented below is a review and summary of all the submissions received in response to the PER for the Health Department's proposal.

THE NEED FOR THE PROPOSAL

Nature of the Waste

. there is a need for a full audit and development of a register of all intractable wastes in Western Australia, specifying the amounts and types of waste to be disposed;

. other intractable wastes to be disposed of at the site should be identified;

. there is concern that it will be difficult to restrict the utilization of the facility to only WA waste, in view of the possible treatment of products such as monazite imported into the state;

. there should be adequate testing of organochloride materials to be disposed of to prevent problems associated with incorrect labelling.

Alternatives to the Proposal

. the commercial application of the research of James Beattie of Sydney University is viewed as an alternative to the proposed method of disposal by incineration;

. waste material should be disposed of at the point of origin, therefore eliminating the need for transport.

General Concerns

. there is a need for something to be done to ensure that toxic wastes are sent to the facility and not forgotten;

. there is a perceived need for a research fund to be established to develop methods to reduce the production of waste. The fund could be generated from a tax on the profits of companies disposing of waste;

. will those operating the facility be government employees or the staff of contractors;

. there is general concern that the facility will become a disposal site for national and international waste.

ENABLING LEGISLATION

. statutory legislation should be in place before work is commenced on the facility;

. any move to privatise the facility should be reviewed by the EPA and local environmental groups;

. it is considered that 10 years is an insufficient period of time for the company to be held liable for the waste it has produced.

PROPOSED SITE

Site Selection

. the areas chosen for the siting of the facility are the result of a desk study only;

. no site can be considered suitable for the long term storage of radioactive material;

. the location and use of the quarry indicated in the incinerator plant layout (Fig. 3.3, item 5) is not specified;

. the proposed site locations are described as flat, when in actual fact the sites vary between 400m to 480m AHD;

. consideration should be given to site factors such as high winds (resulting in airborne contamination by gases and dust) and the potential for flooding and earthquakes;

. clarification of the involvement of Rhone Poulenc in the selection of the site;

. there is a need for a detailed study of the existing flora and fauna communities of the sites proposed, and an assessment of the potential for the facility to impact both directly and indirectly on surrounding areas;

. concern that no consideration will be given to the natural history surveys being conducted in the region;

. the groundwater resource of the proposed sites need to be investigated and clearly understood;

. there is a need for baseline studies at the chosen site for both PCB and radiation levels;

. clarification of the need for a 15 km buffer zone and the basis on which this distance was chosen;

. the location of the facility in a remote site is considered unacceptable because of the time to reach the site in the event of an emergency;

. further details are required on the geology and hydrogeology of the site to determine the suitability of:

  - rock types which should generate appropriate pH and eH conditions to ensure precipitation of any contaminates moving from the trenches;

  - ground water which should have the appropriate chemical constitution and slow to stagnant flow rate to encourage precipitation of contaminants.

Conflicts with Current Uses

. current land use information is insufficient;

. concern that the two sites proposed are too close to existing (and proposed areas) reserved for their flora and fauna value in the Kalgoorlie/ Jackson areas;

. the proposed sites are in areas of transitional woodland which are presently utilized for sandalwood harvesting and which could have future value and use;

. the recreational interests of the Goldfield people (prospecting, bottle collecting, camping etc) would indicate that no site in the region can be considered remote;

. the recharge of Lake Deborah needs to be investigated to ensure that there would be no contamination of the salt resource that is currently mined in the lake;

. increased recharge as a result of clearing could result in increase surface discharge of ground water at the surface;

Long Term Site Suitability

. questions were raised regarding, the possibility of increased rainfall in the future, the long term geological stability of the site, and the implications of these on the storage of longlived radioactive wastes;

. no details are given in the report regarding the rehabilitation of the site.

Site Security

. the chain mesh fence is inadequate as a deterrent to humans and wildlife such as small mammals and birds;

. the disposal pond will be accessible to wildlife, particularly avifauna, and result in the contamination of the food chain;

. concern was expressed about the long term security of the site;

. restricted and hazardous areas should be specified and access limited to authorized personnel.

TRANSPORT OF THE WASTE

. the waste should only be transported by rail and not road and it is considered unacceptable to contract the transport of the waste;

. exact transport routes need to be specified;

. the effects of the transport of monazite are unknown and therefore it can not be used as a generalization for the transport of other wastes;

. Pinjarra is considered unacceptable as a storage and transfer site because of the increase in background radiation levels, the unnecessary exposure of workers to radiation contrary to the Alara principal and the possibility for the accidental spillage of the waste;

. the bulk handling of the waste permitted in the Transport code does not allow a sufficient margin of safety should there be an accident;

. no detail is provided regarding emergency procedures (such as evacuation) and the responsibility of the proponent to provide such procedures;

. it is proposed that all transport workers carry protective clothing in the event of an accidental spillage of waste;

. concern that existing radiation standards may be lowered;

. concern that the transport of radioactive waste will be permitted through populated areas and thus increase the risk of the public's exposure to radiation.

Handling of Waste

. there is a need to concrete radioactive wastes in view of the potential potential for spillage and the associated problems of drying out and the production of fine dust which will be impossible to clean up and thus present a health hazard;

. the waste should be packaged in plastic lined metal drums for transport;

. concern was expressed regarding the transport of radioactive wastes in bulka bags;

. the radiation levels associated with waste containers should be specified;

. containers of waste should be inspected at each transfer point for damage;

. it was considered that mechanical transfer of waste should be used whenever possible.

THE INCINERATOR

Design

. hazardous waste incinerators are known to emit toxic chemicals and metals to the atmosphere (Greenpeace Toxics 1987);

. the PER does not fully address the negative aspects of incineration which have been shown to occur in Scotland, Wales and the USA;

. the design of the incinerator is still experimental and many existing incinerators have serious problems.

Specifications

. the size of the incinerator is not specified;

. the analysis of flue emissions by modelling is impossibly complex because of the differing incinerator designs (EPA SCI Adv Brd 1985);

. there is concern that the combustion efficiency of the incinerator is not as high as detailed in the PER;

. uncertainty as to whether an excess of at least 3% oxygen is sufficient at an afterburner temperature of 1200 oC;

. it is not specified whether 3% excess oxygen will be irrespective of the nature of the material being burnt (eg. gas or gloves);

. is an emission level of 1 gm of PCB/ tonne considered acceptable?

. the exact nature and composition of the incinerator emissions should be detailed;

. concern regarding the implications of the review of current US emission standards, and potential lowering of the standards, on the present proposal.

Alternatives to the proposed Design

. consideration should be given to a rotary kiln design in view of its efficiency and reduced risk of accidental exposure to workers;

. consideration should be given to making the incinerator a mobile unit;

. the Afterburner emergency relief valve should be vented to the quench chamber and not to the atmosphere.

Operational

. the question was asked whether 658 mg of PCB in the offgas would result in contamination;

. it was considered that the use of angle grinders would raise the temperature of metals and have the potential to liberate dioxins;

. there are no details of measures to prevent toxic emissions during the commissioning phase;

. there is no provision for the automatic shutdown of the incinerator process in the event that PCBs, furans or dioxins are detected in flue emissions;

. concern that the high temperatures of the Goldfields will result in the vapourisation of PCBs.

. it is considered inappropriate to combine various liquids in a mixing tank in view of the paucity of knowledge regarding the effects mixing;

. information on the quantity of PCB to be stockpiled on the site should be detailed for both normal operation and in the event of a closure of the incinerator for whatever reason;

. there was a perceived need for all liquid waste (PCB etc) to be specified, quantified and monitored before disposal;

. the waste disposed of in the liquid waste disposal pond should be analysed and its effect on the biota detailed.

RADIOACTIVE WASTE DISPOSAL

. the decay chain for gamma radiation should have been specified in addition to that for alpha radiation;

. the concern was raised whether radiation standards of the facility would be lowered if International standards were lowered;

. there is concern that the trench method of disposal outlined in the report will result in the immersion in water of the radioactive waste causing problems of contamination;

. the exact construction details of the trenches are not provided and the method of landfill is unsuitable as the 2 m cover specified will be subject to erosion and in the long term result in the exposure of the radioactive waste;

. there is the possibility that the plastic bags used to contain the waste will rot;

. it was suggested that the waste material be buried at least 20 m below the surface to allow for erosion and that an impermeable capping layer be provided.

. further details are required on the design of chemical and physical barriers consideration should be given to the rock armouring of the trench area to encourage shedding of water and control of erosion;

RADIATION HAZARDS

. the PER fails to address the actuality of the escape of Radon gas;

. the danger of gamma radiation to the ecosystem requires a particle dispersion analysis;

. the unacceptable risk to human health and the potential for future health problems associated with an increase in radiation levels associated with the proposal;

. the increase of background radiation levels because of the exposure of wastes and the venting of radioactive gases to the atmosphere;

. radiation levels should be specified;

. concern that plant workers and residents of the area will be exposed to radiation levels 50 times greater than is currently permitted for members of the public;

. the future stability of the facility and the site, and the associated cost to maintain the site, were questioned in view of the longterm radioactivity of the waste;

. reference was made to the contingency plan that relied on personnel with shovels to dispose of radioactive spillage. This is considered naive and dangerous to the workers involved;

. no provisions are specified in the event of a leakage of radioactive waste due to floods or earthquakes.

CONTAMINATION

. there is no statement clarifying the assessment of contamination nor the detailing of specific provisions relating to the decontamination of containers;

. there was concern expressed that contaminated transport will be utilized to backload salt from deposits in the region and thus extend the area of contamination;

. there are no details relating to the maintenance procedures for contaminated items such as hydraulic press dies;

. the contamination of ground water and streams due to the leakage of radioactive wastes and dusts;

. concern was expressed by apiarists that utilize the floral resources in the area regarding the effects of contamination on bees and aviaries;

. the extent of movement of radioactive gases and airborne dust particles is unknown and there is concern that contamination of local flora and wheat areas may result;

. the cumulative effects in the region of both PCBs and Sulphur dioxide;

. radioactive contamination of the food chain and the potential for contamination of humans and other higher order consumers.

CONTINGENCY PLANNING

. no contingency plan exists for the evacuation of the Goldfield's population centres and residents who live along the transport route in the event of a catastrophic accident;

. there will be a greater pressure and risk placed on emergency services;

. there is a need for contingency planning (eg. spillages, emergencies) to be discussed with local residents;

. there is a need for Western Australian fire brigades and volunteers to be trained in the handling of PCBs and radioactive wastes;

. concern was expressed over the time it would take for a body of people (EPA or Health Department) to reach the site of an emergency or accident;

. the regulations and Codes of practise should be detailed in the PER;

. there is no detailed planning for accidental spillages during transport;

. it was considered that a specific hazard and risk analysis which is not restricted to the size of the facility is required;

. in the event of a venturi scrubber failure, no indication is given of the time it would take to identify the failure, the extent of acid gas emission and procedures for shutting down of the incinerator;

. there is no contingency planning for emission levels being exceeded or if leaching of radioactive waste to the environment is found to have occurred;

. training programs for workers should be established to satisfy the requirements of the Departments of Health and Mines;

. in view of the toxic and flammable nature of the chemicals to be disposed of at the site, it is considered a serious omission that no firebreak for the facility is mentioned;

. there are no details specified for a fire prevention system;

. there is the potential for sparks from angle brinders to ignite flammable and explosive material.

MONITORING

General

. regular monitoring programs should include monitoring of the soil, flora, ponding water and surface discharge and that monitoring should not be restricted to the site, but include a greater area

. an independent body should be responsible for monitoring;

. the transport route should be monitored both before and during the operation of the facility;

. no detail is provided regarding the monitoring of the facility after closure;

. the noise levels of the site needs to be addressed.

The Incinerator

. random sampling of the flue emissions is a technological anachronism as a method of monitoring the same;

. no indication is given as to flue emission monitoring percentages;

. there are no reliable methods which exist to measure or monitor incinerators (Greenpeace Toxics 1987);

. no exact details of monitoring regularity are stated in the report;

. it is considered unacceptable to determine the destruction and removal efficiency of the incinerator using only one trial burn;

. monitoring should be carried out during the normal operation of the facility;

. there is a need for clarification of how a combustion efficiency of 99.9% for the proposed facility relates to the standard of 99.9999% destruction of PCBs developed by US agencies.

MANAGEMENT OF THE FACILITIY

. it was suggested that a detailed Waste Management programme be submitted to the Radiological Council, IMRC and other bodies, which would include an operations manual, a maintenance manual, detail of emergency procedures, a radiation management plan, conceptual plans for decommissioning of the plant, rehabilitation etc, institutional contacts;

. concern was expressed regarding the enforcement of the regulations governing the facility and the possibility of complacency with time;

. provision should be made for the prosecution of the Health Department for any breach of regulation;

. the records of the facility should be available for publication and evaluation by an independent authority;

. management of the facility should be in consultation with the EPA and recognized local environmental groups. The former should have the funds and power to control the management of the facility;

. concern was expressed that the records will not be made available to the public on an ongoing basis;

. there should be the provision for a fulltime qualified safety officer employed on site with radiation experience.

SOCIAL AND ECONOMIC IMPACTS

. the negative impact the facility will have on tourism in the Goldfields region due to the public's fear of the healthy risks associated with the disposal of hazardous wastes;

. the development of the facility will encourage other noxious industries to be located in the region;

. the ongoing financial liability to the taxpayers of the State for millions of years to monitor the facility and maintain the wastes in a safe condition;

. the potential for the contamination of primary produce in the area and the subsequent refusal of local and overseas consumers to purchase the produce;

. the fear of radioactive contamination of the will have a negative impact on land values of the surrounding areas;

. the decision to site a potentially dangerous industry in the area is shotsighted in view of the fact that the Goldfields region is developing into a major population centre;

. there is the need for a tax on the companies that produce waste.

Prepared by John F Spice
27/07/1988

APPENDIX C

LMD:DLH CS 283

RADIATION HEALTH BRANCH

RESPONSE TO THE EPA SUMMARY OF SUBMISSIONS FOR THE PROPOSED INTEGRATED WASTE DISPOSAL FACILITY

INTRODUCTION

The Health Department of Western Australia prepared a Public Environmental Review (PER) for a proposal to develop an Integrated Waste Disposal Facility on vacant Crown land in the Yilgarn/Coolgardie area of Western Australia.

The PER was released for public comment on 20 May 1988.

Immediate response from local shires, concerned citizens and interested community groups indicated that the two sites identified in the PER were perceived to be too close to agricultural activities and human habitation.

An Appendix to the PER was released for public comment on 1 August 1988. This Appendix identified a third site which is more remote from agricultural activities and human habitation and is the preferred location. Test drilling on this site showed it to meet the appropriate criteria required for such a facility.

Comments received by the Environmental Protection Authority were summarised and reviewed by the EPA. This summary and review is reproduced in Annexe A. It was supplied to the Health Department so that appropriate responses could be made.

The Health Department has provided a response to each of the summary comments received from the EPA. These have been listed in the same order as they were supplied by EPA.

THE NEED FOR THE PROPOSAL

Nature of the Waste

COMMENT: There is a need for a full audit and development of a register of all intractable wastes in Western Australia, specifying the amounts and types of waste to be disposed.

HEALTH DEPARTMENT RESPONSE:

It is agreed that such a register is desirable. Full information about radioactive wastes and their disposal is already known to the Health Department. A register of the largest volumes of PCBs, DDT and other

organochlorines also exists. Other intractable wastes in Western Australia will be listed through the Waste Management Section of the Health Department and DOSHWA. Ongoing waste identification and classification will be undertaken by the Waste Management Section.

COMMENT: Other intractable wastes to be disposed of at the site should be identified.

HEALTH DEPARTMENT RESPONSE:

The Public Environmental Report identified that other intractable wastes, including radioactive wastes from industry, medicine and research, as well as other solid and liquid intractable wastes of a chemical nature including spent catalysts etc, could be disposed of at this facility. It was stated in both Section 1.1 and in Section 2.4 of the PER that disposal of these other wastes would require separate assessment by the EPA. Submissions for these separate assessments will be made as required.

COMMENT: There is concern that it will be difficult to restrict the utilisation of the facility to only WA waste, in view of the possible treatment of products such as monazite imported into the State.

HEALTH DEPARTMENT RESPONSE:

The PER restricted the wastes to those generated in Western Australia. This will be reflected in the legislation to be enacted by Parliament. Once established, it will require review through both Houses of the WA Parliament to change the acceptance of wastes from Western Australia only to a wider sphere. If monazite is imported into the State for processing within the State in future, the by-products of that treatment would be disposed of within Western Australia as being generated within Western Australia. However, there is no intent that radioactive materials would be imported into Western Australia solely for the purpose of disposal without significant downstream processing occurring within Western Australia.

COMMENT: There should be adequate testing of organo-chlorine materials to be disposed of, to prevent problems associated with incorrect labelling.

HEALTH DEPARTMENT RESPONSE:

Section 3.7.2 of the PER states that prior to entering into an agreement to treat organo-chlorine wastes, the Health Department and a representative of the owner of the waste will inspect the waste and take samples to determine:

Content (eg. concentration of PCBs)
Heat content (related to the proportion and type of any solvent present)
Contamination with water,clothes, rag, grit etc.

The waste containers will be appropriately labelled. Thorough documentation of all details of the wastes will be carried out.

Alternatives to the Proposal

COMMENT: The commercial application of the research of Dr James Beattie of Sydney University is viewed as an alternative to the proposed method of disposal by incineration.

HEALTH DEPARTMENT RESPONSE:

The research being carried out by Dr James Beattie is acknowledged in Section 2.2.4 of the PER. However, it is advised in the PER that the research team aims to have a small scale demonstration plant built by the end of 1989. The demonstration plant will enable testing of the process on various classes of organo-chlorine compounds (such as Hexachlorobenzene, organo-chlorine pesticides, polychlorinated biphenyls) to determine its viability. As with most other chemical and biological processes for destruction of these compounds, the process has two major drawbacks:

It is in the research stage only;
It is not applicable to all situations.

Specifically it is not suitable for any contaminated solid waste.

These aspects are discussed in some detail on page 9 of the PER. One of the conditions for the proposed Integrated Wastes Disposal Facility was to use existing proven technologies only.

COMMENT: Waste material should be disposed of at the point of origin, therefore eliminating the need for transport.

HEALTH DEPARTMENT RESPONSE:

There is merit in this point of view for those cases where the waste material can be disposed of at the point of origin in a safe manner without detriment to employees, public or the environment. Unfortunately, it is not always possible to achieve this ideal situation and hence the proposal for the Integrated Waste Disposal Facility has been necessary. Many other developed countries have come to the same conclusion as

have indeed all studies previously carried out within Australia.

General Concerns

COMMENT: There is a need for something to be done to ensure that toxic wastes are sent to the facility and not forgotten.

HEALTH DEPARTMENT RESPONSE:

This is a good point. It will also be necessary to ensure that toxic wastes are not disposed of by clandestine manner in order to avoid the charge which will be associated with sending them to the Integrated Waste Disposal Facility. Through the Waste Management Section of the Health Department and the Environmental Protection Authority, a comprehensive inventory of all Western Australian wastes will be maintained and continually updated.

There will be environmental and social benefits from the establishment of the Integrated Wastes Disposal Facility as wastes which have previously been disposed of by means other than the best available technology, or stored, will now be directed to this facility.

COMMENT: There is a perceived need for a research fund to be established to develop methods to reduce the production of waste. The fund could be generated from a tax on the profits of companies disposing of waste.

HEALTH DEPARTMENT RESPONSE:

It is agreed that there is a need to develop methods to reduce the production of waste by recycling, further production into saleable products or other methods. It would be a matter for government to decide whether a tax should be levied on the profits of companies disposing of waste in order to set up a research fund to develop methods to reduce production of waste. The Health Department keeps abreast of development of waste minimisation schemes, both interstate and overseas and these are promoted to WA industry on a continual basis.

COMMENT: Will those operating the facility be government employees or the staff of contractors?

HEALTH DEPARTMENT RESPONSE:

As stated in the PER, the Health Department undertakes to own and operate the facility. This means that the employees will be government employees employed by the Health Department for this purpose.

COMMENT: There is general concern that the facility will become a disposal site for national and international waste.

HEALTH DEPARTMENT RESPONSE:

The Health Department clearly states in the PER that the legislation to be enacted governing this facility will restrict it to handling of wastes generated in Western Australia only. It will require modification of this legislation through both WA Houses of Parliament in order to broaden the scope for acceptance of either national or international waste.

ENABLING LEGISLATION

COMMENT: Statutory legislation should be in place before work is commenced on the facility.

HEALTH DEPARTMENT RESPONSE:

It is intended that the statutory legislation would be completed and in place before the facility accepts its first load of waste for either burial or incineration.

COMMENT: Any move to privatise the facility should be reviewed by the EPA and local environmental groups.

HEALTH DEPARTMENT RESPONSE:

The proposed legislative cover for the facility will not provide for any privatisation. The facility is to be owned and operated by the Health Department and this will be reflected in the legislation.

COMMENT: It is considered that ten years is an insufficient period of time for the company to be held liable for the waste it has produced.

HEALTH DEPARTMENT RESPONSE:

The figure of ten years was taken from the French National Radioactive Waste Disposal Site ANDRA. Other waste disposers such as those in the United States of America, do not have a redress time at all. Once wastes are consigned to those facilities, ownership of the waste transfers to that facility at the same time. The Health Department considers that ten years is probably an adequate time during which the producing company can be held responsible for the wastes that they have produced. Within this time, it should become evident if those wastes have been improperly packaged or conditioned for disposal and have interacted with adjacent wastes. However, the Health Department would be prepared to review a period of ten years with a view to extending it to say 15 or 20 years on the advice of

the Control Committee which is to be appointed to control the design and operation of the facility.

PROPOSED SITE

Site Selection

COMMENT: The areas chosen for the siting of the facility are the result of a desk study only.

HEALTH DEPARTMENT RESPONSE:

Test drilling was carried out on Site 1 detailed in the PER. No test drilling was carried out on Site 2 in the PER. The preferred 3rd site identified in the August 1988 Appendix to the PER was selected as a result of both desk top studies and several field investigations. Test drilling of this preferred 3rd site has shown that it meets the geological and hydrogeological criteria. Further assessment and evaluation of this site will proceed as undertaken in the PER.

COMMENT: No site can be considered suitable for the long term storage of radioactive material.

HEALTH DEPARTMENT RESPONSE:

The site is being designed in compliance with international recommendations from bodies such as the International Atomic Energy Agency. It is intended that the minimum criteria will be full compliance with all of the requirements such as IAEA and the NH & MRC's proposed classifications and criteria for burial of radioactive wastes.

COMMENT: The location and use of the quarry indicated in the incinerator plant layout (Figure 3.3, item 5) is not specified.

HEALTH DEPARTMENT RESPONSE:

Figure 3.3 'Incinerator Plant Layout' was mistakenly taken from the Koolyanobbing PER written in December 1986.

The reference to the quarry in item 5 refers to the quarry that is close to that previous site.

There are no quarries near the proposed sites. The burnt products consisting of heat treated capacitor cases etc. will be buried in shallow trenches on site.

COMMENT: The proposed site locations are described as flat, when in actual fact the sites vary between 400 metres to 408 metres AHD.

HEALTH DEPARTMENT RESPONSE:

The term 'flat' is used here in its geographical sense. The proposed third site, which is now the preferred site, is not flat but is gently undulating up to 500 metres AHD. As part of the preliminary design work, full survey of the site indicating contours will be carried out.

COMMENT: Consideration should be given to site factors such as high winds (resulting in airborne contamination by gases and dust) and the potential for flooding and earthquakes.

HEALTH DEPARTMENT RESPONSE:

Consideration has been given to the above site factors. All sites are remote from agriculture and habitation. The potential for flooding has been taken into account and the facility will be located on high ground. The prospect for earth quakes has been taken into account and because the facility is located above bedrock forming part of the Yilgarn Block, it is one of the most stable geological locations in the world. Should it be shaken by earthquakes, it will not cause disruption of the facility.

COMMENT: Clarification of the involvement of Rhone Poulenc in the selection of the site.

HEALTH DEPARTMENT RESPONSE:

Sites 1 and 2 were initially identified in the ERMP/EIS document prepared by Rhone Poulenc. Selection of the preferred third site had nothing to do with Rhone Poulenc. This site was selected initially on the advice of the local shires and by independent assessment by Geological Survey personnel. All sites have had preliminary assessments and have the appropriate geological and hydrogeological characteristics while being remote from agriculture and habitation. Site 3 is preferred because it is more remote than the other two sites.

COMMENT: There is a need for a detailed study of the existing flora and fauna communities of the site proposed, and an assessment of the potential for the facility to impact both directly and indirectly on surrounding areas.

HEALTH DEPARTMENT RESPONSE:

As stated in the PER, the Health Department guarantees there will be a detailed study of the existing flora and fauna communities of the site proposed before the

site is developed. This commitment will be met and the environmental surveys will be amongst the first of the works to be undertaken at the preferred site.

COMMENT: Concern that no consideration will be given to the natural history surveys being conducted in the region.

HEALTH DEPARTMENT RESPONSE:

Natural history areas in the goldfields have centred around the mineralised zones and woodcutting areas as well as some watering points. There is no evidence to suggest that the sandplain landscapes where the three sites are located have any significant natural history.

The three sites have been virtually inaccessible except by foot. In the preliminary work of assessing the sites, there was no evidence of any prior human habitation. Site surveys to be conducted early in the development of the site will take into account the natural history of that area.

COMMENT: The groundwater resource of the proposed sites needs to be investigated and clearly understood.

HEALTH DEPARTMENT RESPONSE:

Preliminary drilling has shown that there is no recoverable groundwater beneath sites 1 and 3. Therefore, the migration by water routes of any leachates will be minimal. Preliminary testing would have to be carried out to confirm the hydrogeological suitability of site 2 before it could be further considered.

COMMENT: There is a need for baseline studies at the chosen site for both PCB and radiation levels.

HEALTH DEPARTMENT RESPONSE:

The Health Department undertakes a commitment in the PER that baseline studies will be carried out for both PCB and radiation levels. These commitments will be honoured.

COMMENT: Clarification of the need for a 15 km buffer zone and the basis on which this distance was chosen.

HEALTH DEPARTMENT RESPONSE:

The 15 km buffer zone was not chosen on the basis of dilution of any discharges from the facility. It was chosen as an optimum distance to keep the site separated from any future agricultural or other human development. The intent of the buffer zone is to

prevent development from occurring sufficiently close to the site that would lead to community expectations of its removal to a more remote location. Although this is unlikely, declaration of the boundary by the Health Department will ensure that this will not happen in the future.

COMMENT: The location of the facility in a remote site is considered unacceptable because of the time to reach the site in the event of an emergency.

HEALTH DEPARTMENT RESPONSE:

The facility will incorporate an airstrip as part of the access road to the facility. This will facilitate a quick response to the site in the event of a large scale emergency. However, the design of the facility will be such that all envisaged emergencies will be able to be coped with on site.

COMMENT: Further details are required on the geology and hydrogeology of the site to determine the suitability of:

rock types which should generate appropriate pH and eH to ensure precipitation of any contaminants moving from the trenches;

groundwater which should have the appropriate chemical constitution and slow to stagnant flow rate to encourage precipitation of contaminants.

HEALTH DEPARTMENT RESPONSE:

Detailed studies of the rock types will be carried out as part of the preliminary engineering design. As there is no recoverable groundwater within the area of the facility, there will be stagnant flow which will encourage precipitation of contaminants. Because the evaporation rate is ten times the rainfall rate, it is exceedingly unlikely that any contaminants will move from the disposal trenches as the deposited water will tend to evaporate out of the soil surface before it can flow through the clay to any other location. Final contouring will also encourage drainage away from the trenches.

Conflicts with Current Uses

COMMENT: Current land use information is insufficient.

HEALTH DEPARTMENT RESPONSE:

Sites 1 and 3 are on vacant Crown land. Site 2 occurs within the 10 km transport corridor on vacant Crown land. The areas have no current use for any purpose. The proposed regions have no agricultural value for pastoral or tillage agriculture. They do not include areas of mineralisation and has been generally inaccessible.

Areas of recreation, eg. flora appreciation, fossicking etc have occurred to the west in the Bungalbin Ranges, to the south at Wallaroo Rocks and the south west around Ryans Find. Mount Manning Nature Reserve is currently being assessed and an extension of the reserve is proposed.

The siting of the facility would not restrict any of these activities.

The closest nature reserves are Mount Manning Nature Reserve 50 kms to the north west, a reserve (vesting unknown) around the Aurora and Helena Ranges, 50 kms to the west and Boorabbin Nature Reserve approximately 30 kms south of Site 2. The activities of the facility would not impact on these regions. The 15 km exclusion zone only excludes permanent habitation. Activities such as flora appreciation, fossicking and sandalwood harvesting may still occur within this zone.

COMMENT: Concern that the two sites proposed are too close to existing (and proposed) areas reserved for their flora and fauna value in the Kalgoorlie/Jackson areas.

HEALTH DEPARTMENT RESPONSE:

The 3 sites vary in distance from proposed and existing reserves. They range from 30 - 80 kms from the nearest reserve. The facility will require the gazetting of an area approximately 5 kms square. The operation of the facility will not impact on the surrounding vegetation outside this area. As part of the preliminary investigation for the area, detailed studies of flora and fauna will be carried out.

COMMENT: The proposed sites are in areas of transitional woodland which are presently utilised for sandalwood harvesting and which could have future value and use.

HEALTH DEPARTMENT RESPONSE:

All three sites occur on sandplain country. There are no reserves of sandalwood in the proposed regions.

The proposed 15 km buffer zone may cover areas of

transitional woodland including reserves of sandalwood. Sandalwood harvesting and other temporary activities can still occur within this zone. The activities of the facility will not impinge on activities outside this zone.

COMMENT: The recreational interests of the goldfields people (prospecting, bottle collecting, camping etc) would indicate that no site in the region can be considered remote.

HEALTH DEPARTMENT RESPONSE:

All three sites have been virtually inaccessible. There is no evidence of prior occupation and the areas are outside the greenstone belts which are suitable for prospecting. It is a requirement for the site that it be remote from potential gold bearing or other mineralisation areas.

COMMENT: The recharge of Lake Deborah needs to be investigated to ensure that there would be no contamination of the salt resource that is currently mined in the lake.

HEALTH DEPARTMENT RESPONSE:

Sites 1 and 2 occur within the area which drains into the Lake Seabrook and Lake Deborah systems.

Site 3 occurs in the area which drains into the old paleo-drainage system which flows north east to Lake Ballard and Lake Raeside. The activities which will occur on site will not pose any threat via contamination of surface water.

COMMENT: Increased recharge as a result of clearing could result in increased surface discharge of groundwater at the surface.

HEALTH DEPARTMENT RESPONSE:

Clearing will be kept to the minimum necessary to operate the facility. Following the completion of trenches, they will be replanted with shallow rooted, arid zone plants and this will minimise the run-off of surface water. The engineering design of the facility will take into account the surface run-off which may occur at the facility. As there is no groundwater between the surface and the bedrock granite, there will be no increase in surface discharge of groundwater.

Long term Site Suitability

COMMENT: Questions were raised regarding, the possibility of increased rainfall in the future, the long term geological stability of the site, and the implications of these on the storage of long lived radioactive wastes.

HEALTH DEPARTMENT RESPONSE:

All three sites are on elevated ground and will drain satisfactorily in the event of increased rainfall in the future. The long term geological stability of the area is as good as any that is likely to be able to be found in the world. The Yilgarn Block on which these sites are located is one of the oldest geological structures in the world and has an established history of long term geological stability. It can be reasonably expected that this stability will continue for the foreseeable future. The implication for the storage of long lived radioactive wastes is that this area is one of only a few in the world which complies with all of the requirements set by the IAEA for shallow ground burial of radioactive waste.

COMMENT: No details are given in the report regarding the rehabilitation of the site.

HEALTH DEPARTMENT RESPONSE:

Details about rehabilitation of the site are contained on page 41 of the PER. Filled trenches will be completed in a manner which will:

- minimise the possibility of the wastes becoming uncovered due to erosion, flood and natural ecological processes;
- require a minimum of maintenance during the operational life of the Integrated Wastes Disposal Facility;
- have the objective that no maintenance will be required during the post operational phase;
- minimise the likelihood of leaching due to infiltration of rainwater; and
- return the site surface to natural gamma background radiation levels for the area.

Filled trenches will be covered by a compacted clay layer formed to divert rainwater infiltration to the sides, and may incorporate a layer of stone to minimise the potential erosion.

Site Security

COMMENT: The chain mesh fence is inadequate as a deterrent to humans and wildlife such as small mammals and birds.

HEALTH DEPARTMENT RESPONSE:

It is intended to fence only the area which is necessary for current operations and previously filled trenches. There will be two fences around the incinerator facility. Entry through the inner fence will be restricted to authorised personnel only. There will be no need for the fences to act as a deterrent to wildlife such as small mammals and birds.

COMMENT: The disposal pond will be accessible to wildlife, particularly avifauna, and result in the contamination of the food chain.

HEALTH DEPARTMENT RESPONSE:

The rain/process water pond will be accessible to birds but will not be contaminated. However, it will be subject to regular monitoring.

The disposal and evaporation pond from the incinerator will contain salt water with amounts of non-reacted caustic. Levels of contaminants which could enter the food chain will be monitored and be re-treated through the incinerator if necessary.

COMMENT: Concern was expressed about the long term security of the site.

HEALTH DEPARTMENT RESPONSE:

Long term security of the site will be guaranteed as long as there is a Western Australian government. As this site does not have a finite use term, it will be in existence for as long as there is a Western Australian government. The site will therefore be occupied and this will ensure security.

COMMENT: Restricted and hazardous areas should be specified and access limited to authorised personnel.

HEALTH DEPARTMENT RESPONSE:

Restricted and hazardous areas will be specified and access will be limited to authorised personnel only.

TRANSPORT OF THE WASTE

COMMENT: The waste should only be transported by rail and not road and it is considered unacceptable to contract the transport of the waste.

HEALTH DEPARTMENT RESPONSE:

The government has already dictated that transport should be by rail where possible. Road transport will be necessary for the final section of transport from the railhead to the actual disposal site. The responsibility for total transport will lie with Westrail and not with private contractors.

COMMENT: Exact transport routes need to be specified.

HEALTH DEPARTMENT RESPONSE:

The Government has made a commitment to use rail transport where possible.

The proposed thorium hydroxide gangue waste would be transported by rail from Rhone Poulenc's holding yard through Pinjarra, Mundijong and on to Kwinana.

Transfer from narrow gauge to standard gauge would occur at Kwinana or Forrestfield. Transport would then proceed up the Standard Gauge line to Koolyanobbing or Jaurdi Siding where it would be offloaded and trucked to the disposal site on a private road.

The PCB waste would be transported from the storage depot in Baldivis to Kwinana, loaded onto standard gauge rail wagons and transported to the offloading siding. Transport from the siding to the facility would be by truck on a private road.

The other organochlorine waste destined to be disposed of at the facility is currently being held at various regional country centres. It is proposed that these chemicals would be trucked by Westrail from each storage site to the disposal facility.

COMMENT: The effects of the transport of monazite are unknown and therefore it cannot be used as a generalisation for the transport of other wastes.

HEALTH DEPARTMENT RESPONSE:

The effects of the transport of monazite are known very well as monazite has been transported through Western Australia for the last twenty years at least. Transport of any radioactive material will be in

compliance with the Code of Practice for the Safe Transport of Radioactive Substances which is incorporated in the Regulations under the Radiation Safety Act. Transport of radioactive materials may only be done by personnel who have attended a course at the Radiation Health Branch and who hold an appropriate licence.

COMMENT: Pinjarra is considered unacceptable as a storage and transfer site because of the increase in background radiation levels, the unnecessary exposure of workers to radiation contrary to the ALARA principle, and the possibility for the accidental spillage of the waste.

HEALTH DEPARTMENT RESPONSE:

Westrail does not consider that the Pinjarra siding is unacceptable from the point of view of accidental spillage of the waste. However, Westrail are investigating three alternative proposals for rail transport. These are:-

(i) to put a loop line on the Calcine Spur running into Alcoa plant;

(ii) to construct a spur line running into the Rhone Poulenc plant; and

(iii) to construct a siding at the western end of the Rhone Poulenc holding where the Hotham Valley railway line runs along the western boundary.

The second two proposals will require upgrading of between 5 and 10 kilometres of the Hotham Valley railway line and this is being investigated together with the above proposals.

COMMENT: The bulk handling of the waste permitted in the Transport Code does not allow a sufficient margin of safety should be there an accident.

HEALTH DEPARTMENT RESPONSE:

The Code of Practice for Safe Transport of Radioactive Substances is predicated upon the fact that there will be accidents. The provisions for transport are set on the basis that when an accident occurs there will no unacceptablee levels of contamination or radiation or adverse effect to people.

COMMENT: No detail is provided regarding emergency procedures (such as evacuation) and the responsibility of the proponent to provide such procedures.

HEALTH DEPARTMENT RESPONSE:

Emergency response procedures will be developed and in place before the Integrated Waste Disposal Facility commences operation. These procedures will form an essential part of the detailed design of the facility.

Transport emergency procedures are already in place. These will be further developed through education and training of existing transport accident response personnel.

COMMENT: It is proposed that all transport workers carry protective clothing in the event of an accidental spillage of waste.

HEALTH DEPARTMENT RESPONSE:

The accident response and emergency procedures for dealing with hazardous materials is in place. Westrail has included rail transport into the present WA Transport Emergency Assistance Scheme (WATEAS). Before any wastes are carried to the Integrated Waste Disposal Facility, further detailed emergency response procedures will be in place.

COMMENT: Concern that existing radiation standards may be tightened.

HEALTH DEPARTMENT RESPONSE:

It is possible that the existing radiation standards may be tightened and this has been foreshadowed by the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) following from their meeting in June 1988. The International Commission on Radiological Protection (ICRP) will be considering the information from UNSCEAR and will be releasing revised radiation protection standards in 1990. In anticipation that the existing occupational dose limits may be reduced, the Health Department has already undertaken to work to a maximum occupational dose limit of 10 millisieverts per annum at the Integrated Waste Disposal Facility. This is one fifth of the present maximum occupational radiation exposure limit.

COMMENT: Concern that the transport of radioactive wastes will be permitted through populated areas and thus increase the risk of the public's exposure to radiation.

HEALTH DEPARTMENT RESPONSE:

The Code of Practice for Safe Transport of Radioactive Substances is predicated upon the fact that these materials will be transported through populated areas. The Code provides for maximum radiation intensities emanating from packages or containers in which radioactive material is transported for the very purpose of protecting members of the public from excessive exposure to radiation.

Handling of Waste

COMMENT: There is a need to concrete radioactive wastes in view of the potential for spillage and the associated problems of drying out and the production of fine dust which will be impossible to clean up and thus present a health hazard.

HEALTH DEPARTMENT RESPONSE:

The Health Department is concerned at the potential for drying out and production of fine dust from the gangue waste proposed to be produced by the Rhone Poulenc plant. The occupational radiation dose limit under the present standards will be attained following an annual inhalation of a small number of milligrams of the proposed thorium hydroxide gangue waste. The Health Department does therefore have a responsibility to ensure that any risks which may occur due to the production of dust will be at an acceptable level. For this reason, the Health Department is negotiating with Rhone Poulenc to investigate means by which the proposed thorium hydroxide gangue waste can be converted to a solid before it is accepted for transport. All other wastes destined for burial will be transported as solids.

COMMENT: The waste should be packaged in plastic lined metal drums for transport.

HEALTH DEPARTMENT RESPONSE:

At the La Rochelle and Freeport plants of Rhone Poulenc where the radium waste is precipitated as a concentrate, it is packaged in plastic lined metal drums for transport and disposal. However, at the proposed Western Australian operation at Pinjarra, it is proposed that the radium waste will report to the evaporation ponds on site. The gangue waste, which although it is radioactive, does not require packaging in plastic lined metal drums for transport in order to comply with the requirements of the Code of Practice for Safe Transport of Radioactive Substances.

COMMENT: Concern was expressed regarding the transport of radioactive waste in bulka bags.

HEALTH DEPARTMENT RESPONSE:

Transport of the proposed Rhone Poulenc thorium hydroxide gangue waste in bulka bags, which in turn are inside ISO freight containers would comply with the requirements of the Code of Practice for Safe Transport of Radioactive Material and with the Regulations under the Radiation Safety Act. The Health Department has expressed concern about the transport of radioactive materials in bulka bags in view of the potential radiation exposure to personnel having to handle these bags. Suggestions have been made to the EPA about the investigation of other methods of bulk transport of these materials and/or the solidification of the proposed radioactive wastes which would reduce the extent of any hazard in the event of transport accident and would also reduce the radiation exposures of workers handling these wastes.

COMMENT: The radiation levels associated with waste containers should be specified.

HEALTH DEPARTMENT RESPONSE:

These levels were specified in page 24 of the PER. Measurements on fully loaded ISO containers of monazite from the WA monazite mining industry have shown gamma radiation rates to be about 20 - 50 micrograys per hour in the vicinity of the loaded containers. It is expected that the gamma radiation rates in the vicinity of full ISO freight containers of thorium hydroxide gangue waste will also be between 20 - 50 micrograys per hour.

COMMENT: Containers of waste should be inspected at each transfer point for damage.

HEALTH DEPARTMENT RESPONSE:

It would be normal Westrail procedure to examine the freight containers at each transfer point.

COMMENT: It was considered that mechanical transfer of waste should be used whenever possible.

HEALTH DEPARTMENT RESPONSE:

The Health Department has undertaken to use mechanical transfer whenever possible. This commitment was made in the PER and will also be actively pursued during the detailed design of the Integrated Waste Disposal Facility.

THE INCINERATOR

Design

COMMENT: Hazardous waste incinerators are known to emit toxic chemicals and metals to the atmosphere (Greenpeace Toxics 1987).

HEALTH DEPARTMENT RESPONSE:

The incinerator proposed for the Integrated Waste Disposal Facility will incorporate a scrubbing system to clean the exhaust gases from the incinerator before they are discharged to atmosphere. Many older incinerators used for waste disposal do not have such cleaning devices on the exhaust gases and hence are known to have emissions to atmosphere.

Even without this scrubbing system, the incinerator will be designed to destruct toxic chemicals to levels which are internationally acceptable.

COMMENT: The PER does not fully address the negative aspects of incineration which have been shown to occur in Scotland, Wales and the USA.

HEALTH DEPARTMENT RESPONSE:

The incinerators which have been the cause of public concern in Scotland, Wales and the USA did not have the same degree of efficiency of combustion and clean up of exhaust gases as will be the case with the incinerator to be installed at the Integrated Waste Disposal Facility. The emission criteria to be met by this proposed WA incinerator are detailed in the PER. The concerns about overseas incinerators will not apply to the West Australian incinerator.

COMMENT: The design of the incinerator is still experimental and many existing incinerators have serious problems.

HEALTH DEPARTMENT RESPONSE:

It is acknowledged that many older incinerators do have emission problems. However, the design of the incinerator for the Integrated Waste Disposal Facility will incorporate the latest technology with many safety features to prevent accidental discharge to the atmosphere of incompletely combusted materials. Incinerators have been in use for many years and only the latest proven technology will be used. The efficiency will be confirmed during trial burns.

Specifications

COMMENT: The size of the incinerator is not specified.

HEALTH DEPARTMENT RESPONSE:

Although the actual size of the incinerator was not specified in the PER, on page 37 of the PER it is stated that the proposed incinerator will burn a maximum of several hundred tonnes of waste (including PCBs) each year, operating on one 8 hour shift per day. Future waste streams could be accommodated by operating two shifts or by expanding the facility. The proposed incinerator will therefore be relatively small, even if it is enlarged to accommodate wastes from the proposed petrochemical plant at Kwinana.

COMMENT: The analysis of flue emissions by modelling is impossibly complex because of the differing incinerator designs. (EPA SCI Advisory Board 1985).

HEALTH DEPARTMENT RESPONSE:

On pages 35 and 36 of the PER, the commitment is made to comply with the US Standards of Emission which will be adopted by the Health Department as the operating standard. The commitment is made in the PER that the flue emissions will be monitored, thus there will be no dependence upon any modelling studies.

COMMENT; There is concern that the combustion efficiency of the incinerator is not as high as detailed in the PER.

HEALTH DEPARTMENT RESPONSE:

The commitment is made in the PER that continual monitoring of the combustion efficiency of the incinerator will be undertaken. The results of monitoring will be public information made available in the Annual Report to Parliament and more frequently to the Control and Community Liaison Committees. Because only incinerator manufacturers with an established reputation in this area will be tendering for construction of the incinerator, the Health Department has confidence that the combustion efficiency of the incinerator will meet the undertaking given in the PER. This will be confimed during trial burns.

COMMENT: Uncertainty as to whether an excess of at least 3% oxygen is sufficient at an after burner temperature of 1200^{o}C.

HEALTH DEPARTMENT RESPONSE:

The destruction and removal efficiency guaranteed in the PER will be obtained with a residence time of 3 seconds at 1200°C and at least 3% excess oxygen in the discharge gases. The DRE will be regularly monitored as part of the normal operation of the incinerator.

COMMENT: It is not specified whether 3% excess oxygen will be irrespective of the nature of the material being burnt (eg. gas or gloves).

HEALTH DEPARTMENT RESPONSE:

All wastes which will be burnt in this incinerator will be carefully assessed prior to their introduction into the incinerator. The rate of feed of material to the incinerator will be varied according to the nature of the waste being burnt and the operation will be maintained in a manner such that 3% excess oxygen will always be present in the discharge gases.

COMMENT: Is an emission level of 1 gram of PCB per tonne considered acceptable?

HEALTH DEPARTMENT RESPONSE:

Yes. This is a maximum emission level which is below nearly all other PCB incinerators in the world. Due to the size of the WA incinerator, total emission of PCBs will be far below any overseas commercial operations.

COMMENT: The exact nature and composition of the incinerator emissions should be detailed.

HEALTH DEPARTMENT RESPONSE:

On pages 35 and 36 of the PER, information is provided about the levels of emissions which will not be exceeded. It is the Health Department's concern that all emissions should be minimised and the operation of the incinerator will be along those lines. During the commissioning of the incinerator detailed analysis of the composition of the incinerator emissions will be carried out. During the routine operation of the incinerator there will be continuous monitoring of the flue gas emissions which indicate the efficiency. Other emissions will be monitored at regular intervals.

COMMENT: Concern regarding the implications of the review of current US Emission Standards and potential lowering of the standards on the present proposal.

HEALTH DEPARTMENT RESPONSE:

The potential for continuing reduction in emission standards has been taken into account. The design of this incinerator will be such that its emissions will be amongst the lowest in the world.

Alternatives to the Proposed Design

COMMENT: Consideration should be given to a rotary kiln design in view of its efficiency and reduced risk of accidental exposure to workers.

HEALTH DEPARTMENT RESPONSE:

The only reason for not choosing a rotary kiln is the size required for destruction of WA waste. Overseas rotary kilns generally have 20 to 50 times more capacity than is required here.

This makes the design of a rotary kiln difficult and expensive as the unit, even though low in throughput, must be able to burn whole capacitors and other large items. The efficiency required for either type of incinerator remains the same (ie. more than 99.9999%).

COMMENT: Consideration should be given to making the incinerator a mobile unit.

HEALTH DEPARTMENT RESPONSE:

Mobile incinerators capable of burning PCBs to the US Emission Standards are readily available in the USA and could be constructed to the same efficiency in WA. However, the added safeguards associated with locating the facility in a remote location cannot be provided by mobile units. Neither can the degree of monitoring before, during and after operation. The inherent temporary nature of the mobile incinerator places severe constraints on the ability of operators to ensure the excellence of operation and the exceptional technical performance necessary. In the US, concerns about mobile incinerators include:-

- technical performance
- safety
- employee occupational health provisions.

There would also be the added problem of carrying out an environmental assessment for each site of temporary operation.

COMMENT: The after burner emergency relief valve should be vented to the quench chamber and not to the atmosphere.

HEALTH DEPARTMENT RESPONSE:

This is not required because in the unlikely event of the emergency relief being used, PCB feed will be instantaneously cut off.

Operational

COMMENT: Question was asked whether 658 milligrams of PCB in the off gas would result in contamination.

HEALTH DEPARTMENT RESPONSE:

On pages 35 and 36 of the PER, it is stated that the maximum 1 hour average ground level concentration under worst case weather conditions for PCBs would be 1.3 nanograms per cubic metre. This level is well below proposed US standards. Part of the continuing monitoring programme which will be undertaken will include monitoring of vegetation and natural materials in the vicinity to measure any PCB contamination.

COMMENT: It was considered that the use of angle grinders would raise the temperature of metals and have the potential to liberate dioxins.

HEALTH DEPARTMENT RESPONSE:

The temperature rise caused by angle grinders will not last long enough to generate dioxins and angle grinders will not be used near PCB liquids.

COMMENT: There are no details of measures to prevent toxic emissions during the commissioning phase.

HEALTH DEPARTMENT RESPONSE:

The initial trial burns will be carried out using non-organo-chlorine chemicals to establish the combustion efficiency of the incinerator.

A combustion efficiency of at least 99.9% is required, computed as follows:-

$$CE\% = \frac{\text{Conc of } CO_2}{\text{Conc of } CO_2 + \text{conc of CO}} \times 100$$

Once the combustion efficiency has been confirmed, the criteria of 2 second dwell time at 1200°C and 3% excess oxygen in the gas stack are established. These requirements provide for a 99.9999% destruction of PCBs. Sampling of PCB emissions would be carried out over a trial period using small volumes of PCB to ensure that the DRE is met.

COMMENT: There is no provision for the automatic shutdown of the incinerator process in the event that PCBs, furans or dioxins are detected in flue emissions.

HEALTH DEPARTMENT RESPONSE:

The flue gases will be continually monitored during operation and the design will incorporate automatic shutdown of the incinerator in the event that combustion efficiency is not maintained. Production of furans and dioxins is dependent upon the incinerator efficiency. This is continually monitored through measurements of temperature, excess oxygen, carbon dioxide and carbon monoxide.

Analysis of PCBs, furans and dioxins in the flue gas will be measured at regular intervals to confirm the efficiency.

COMMENT: Concern that the high temperatures of the goldfields will result in the vaporisation of PCBs.

HEALTH DEPARTMENT RESPONSE:

The PCBs which will be held on the site will be contained within tanks and compartments which will be ventilated through the incinerator. Any vaporisation of PCBs will therefore be destroyed by passage through the incinerator before emission to atmosphere.

COMMENT: It is considered inappropriate to combine various liquids in a mixing tank in view of the paucity of knowedge regarding the effects of mixing.

HEALTH DEPARTMENT RESPONSE:

Prior to the mixing of any liquids in a mixing tank, a full analysis of the materials will have been undertaken. The PER undertakes a commitment that all wastes will be analysed prior to combustion. Mixing will be carried out to ensure the most homogenous feed possible.

COMMENT: Information on the quantity of PCB to be stockpiled on the site should be detailed for both normal operation and in the event of a closure of the incinerator for whatever reason.

HEALTH DEPARTMENT RESPONSE:

PCBs will be collected on rotation from the current storage points. Only existing sites will be used for storage until the PCBs are transported to the incinerator site. A possible exception may be a small

Health Department controlled depot for collection of small PCB items.

The same safeguards as at present will be maintained at the storage points.

The quantity of PCBs stored on-site will be approximately three weeks' supply. It should be remembered that tonnes of PCB means PCBs and their containers. For example, a capacitor weighs approximately 40 kilograms, but only 10 kg is PCB.

Three weeks' supply at the proposed destruction rate of 1 tonne per day would mean that approximately 20 tonnes of PCBs would be stored on site. If the facility was temporarily shut down, deliveries would stop to ensure a stockpile would not build up.

COMMENT: There was a perceived need for all liquid waste (PCB etc) to be specified, quantified and monitored before disposal.

HEALTH DEPARTMENT RESPONSE:

The Health Department makes a commitment in the PER to do all of these things.

COMMENT: The waste disposed of in the liquid waste disposal pond should be analysed and its effect on the biota detailed.

HEALTH DEPARTMENT RESPONSE:

The Health Depaprtment makes a commitment in the PER that the liquid in the ponds will be analysed and if found to contain PCBs or organo-chlorines, will be burnt under the same conditions as PCBs. It is not expected that the liquid waste would be contaminated in this way.

RADIOACTIVE WASTE DISPOSAL

COMMENT: The decay chain for gamma radiation should have been specified in addition to that for alpha radiation.

HEALTH DEPARTMENT RESPONSE:

Table 2.1 of the PER provides the full decay chain for both the uranium 238 and the thorium 232 radioactive series. The table includes the information on whether the particular emissions are alpha, beta or gamma for each member of the decay chain.

COMMENT: The concern was raised whether radiation standards of the facility would be lowered if international standards were lowered.

HEALTH DEPARTMENT RESPONSE:

The Health Department has already made a commitment to the EPA that the radiation exposure to workers at the facility will not exceed one fifth of the present occupational dose limit. The Health Department has therefore taken into consideration a safety factor to allow for any proposed future reduction of occupational dose limits.

COMMENT: There is concern that the trench method of disposal outlined in the report will result in the immersion in water of the radioactive waste causing problems of contamination.

HEALTH DEPARTMENT RESPONSE:

Sites 1 and 3 have been test drilled. The test drilling has shown that there is no recoverable water between the surface and the granite bedrock. Therefore, there will be no immersion in water of any of the radioactive waste and hence no problem of contamination.

Site 2 would be test drilled if this site was chosen.

COMMENT: The exact construction details of the trenches are not provided and the method of land fill is unsuitable as the two metre cover specified will be subject to erosion and in the long term result in the exposure of the radioactive waste.

HEALTH DEPARTMENT RESPONSE:

The exact construction details of the trenches were not provided in the PER because the engineering details of the site, soils and clays were unknown. An early component of the detailed design for the burial facility will comprise civil engineering investigation of the characteristics of the soils and clays of the site. Based upon the characteristics of these soils and clays, a trench detail will be designed which will maximise the benefit to be obtained from the local soils. In the PER the Health Department has indicated that filled trenches will be completed in a manner which will minimise the possibility of the waste becoming uncovered due to erosion, flood and natural ecological processes. During the detailed design for the trenches, it is possible that a layer of rock will be included in the cover of the trenches in order to minimise such erosion.

COMMENT: There is the possibility that the plastic bags used to contain the waste will rot.

HEALTH DEPARTMENT RESPONSE:

There is no doubt that over the geological time of storage proposed for the thorium hydroxide gangue waste that the plastic bags would rot. The design of the disposal trenches will take this fact into account.

COMMENT: It was suggested that the waste material be buried at least 20 metres below the surface to allow for erosion and that an impermeable capping layer be provided.

HEALTH DEPARTMENT RESPONSE:

The detailed design of the trenches and final burial depth to be used will follow a detailed engineering analysis of the characteristics of the clay and soils of the site. In the PER, the Health Department undertakes the commitment to cap the trenches with an impermeable clay layer. This will be compacted and graded to divert any rainwater run-off to the sides and not penetrate the waste in the trenches.

COMMENT: Further details are required on the design of chemcial and physical barriers. Consideration should be given to the rock armouring of the trench area to encourage shedding of water and control of erosion.

HEALTH DEPARTMENT RESPONSE:

The detailed design of the trenches will be made following detailed analysis of the characteristics of the soils and clays at the site. Consideration will be given to the rock armouring of the trench area to encourage shedding of water and control of erosion. This will form a normal part of the detailed considerations during trench design.

RADIATION HAZARDS

COMMENT: The PER fails to address the actuality of the escape of radon gas.

HEALTH DEPARTMENT RESPONSE:

The Health Department is committed to undertaking detailed site surveys prior to use of the facility to determine the pre-existing environmental levels of radiation levels, including radon gas. There will also be continuing monitoring during and after the closure of trenches, of the levels of radiation and radon gas.

COMMENT: The danger of gamma radiation to the ecosystem requires a particle dispersion analysis.

HEALTH DEPARTMENT RESPONSE:

Environmental radiation levels will be measured prior to the facility coming into operation. Continuing measurements will be made during and after the closure of trenches. The Health Department has made a commitment in the PER that when trenches are closed the radiation level emanating from the top of a closed trench will not exceed the radiation level which was present before the trench was dug.

COMMENT: The unacceptable risk to human health and the potential for future health problems associated with an increase in radiation levels associated with the proposal.

HEALTH DEPARTMENT RESPONSE:

Radiation levels at the facility will be less than those permitted under the legislation and less than the levels recommended by recognised international expert bodies. The potential for future health problems is taken into account by these expert bodies when setting occupational and public dose limits. Following the closure of any burial trench, the radiation level above that trench will not exceed that which was existing in the same area prior to the digging of the trench.

COMMENT: The increase of background radiation levels because of the exposure of wastes and the venting of radioactive gases to the atmosphere.

HEALTH DEPARTMENT RESPONSE:

Background levels of radiation exposure will be measured prior to the facility coming into operation. The Health Department has made a commitment in the PER that following closure of any trench there will be no increase of radiation level above that which was existing in that area prior to digging the trench. The monitoring which will be undertaken before, during and after operation of the facility will include detailed measurements of radioactive gases emanating from the ground, both from natural sources and also from the wastes which may be emplaced within the trenches.

COMMENT: Radiation levels should be specified.

HEALTH DEPARTMENT RESPONSE:

Radiation levels were specified in the PER on page 24 in respect to the radiation intensities which have been measured from loaded ISO freight containers of

monazite. It is expected that the gamma radiation rates in the vicinity of full ISO freight containers of thorium hydroxide gangue waste will be of the same order as those already measured containing monazite. As part of the operation of the facility, there will be continual monitoring of radiation levels.

COMMENT: Concern that plant workers and residents of the area will be exposed to radiation levels 50 times greater than is currently permitted for members of the public.

HEALTH DEPARTMENT RESPONSE:

The present occupational radiation dose limits specified in Western Australian legislation and by the International Commission on Radiological Protection (ICRP) are:-

50 millisieverts per annum for occupationally exposed workers.
An average of 1 millisievert per annum for members of the general public.

The Health Department has made a commitment to the EPA that the occupational radiation dose levels to be received by workers at the facility will be no greater than 10 millisieverts per annum. This is one fifth of the presently permitted maximum value for occupationally exposed workers. The Health Department has stated that residents in the vicinity will not receive radiation exposures as a result of the facility which will approach the present public limit of 1 millisievert per annum above natural background levels.

COMMENT: The future stability of the facility and the site, and the associated cost to manage the site, were questioned in view of the long term radioactivity of the waste.

HEALTH DEPARTMENT RESPONSE:

The site has been selected because of its known geological stability and the anticipation that such long term geological stability will be maintained. The costs associated with the site will be paid for by the waste producers utilising the site. The costs to be levied for disposal of wastes at the facility will incorporate a proportion of cost to maintain the site into the foreseeable future.

COMMENT: Reference was made to the contingency plan that relied on personnel with shovels to dispose of radioactive spillage. This is considered naive and dangerous to the workers involved.

HEALTH DEPARTMENT RESPONSE:

The proposal in the Rhone Poulenc ERMP for disposal of the thorium hydroxide gangue waste was to transport it in plastic bulka bags inside ISO freight containers. In the event of very serious railway accident, it is possible that the ISO containers could be ruptured and that material from broken bulka bags could deposit upon the ground. This thorium hydroxide waste is basically insoluble. The radiation intensity from such piles of waste would be of a level sufficiently low that the final cleaning up of such spillage could safely be done by workers using shovels. The major hazard associated with a spillage of thorium hydroxide as proposed, would be for it to dry out and become airborne as a dust. It is unlikely that it would readily become airborne, but this consideration needs to be taken into account. It would therefore be necessary to ensure that the workers wore respiratory protection and that the spilled material was kept damp.

COMMENT: No provisions are specified in the event of a leakage of radioactive waste due to floods or earthquakes.

HEALTH DEPARTMENT RESPONSE:

All three sites have been selected to be immune from both floods and earthquakes. The sites are on elevated ground and will drain into the paleo drainage systems of the area. The sites are also located on the Yilgarn Block which is one of the most geologically stable structures in the world. The proposed location of the facility is above solid granite bedrock. Thus, the site selection has taken into account the necessity to minimise the effect on buried waste arising from both floods and earthquakes.

CONTAMINATION

COMMENT: There is no statement clarifying the assessment of contamination nor the detailing of specific provisions relating to the decontamination of containers.

HEALTH DEPARTMENT RESPONSE:

It is not clear whether this concern relates to the incinerator or to the radioactive wastes. A reply will be given for both as follows.

Emptied containers which have been used for transport or handling of PCBs and organo-chlorines will be flushed with solvent for re-use for transport or be crushed and fed through the incinerator before being disposed of as land fill. Monitoring for radioactive

contamination will be a routine function of the daily procedures at the Integrated Waste Disposal Facility. A radiation safety officer will be appointed for the facility with responsibility to ensure that appropriate monitoring for contamination, and that appropriate decontamination is carried out if contamination should be found.

COMMENT: There was concern expressed that contaminated transport will be utilised to backload salt from deposits in the region and thus extend the area of contamination.

HEALTH DEPARTMENT RESPONSE:

Rhone Poulenc have expressed interest in the concept of having dedicated ISO or similar freight containers which would be used to transport the gangue waste to the Integrated Waste Disposal Facility and to backload salt from Lake Deborah. It would be their intention that such containers would be owned by the company and be clearly labelled as such. If this proposal is to proceed, the containers would be confined only to Rhone Poulenc operations and would not form part of the Westrail inventory of freight containers for general use. A routine function at the Integrated Waste Disposal Facility will be to ensure that all containers will be monitored for contamination, and if necessary, be appropriately decontaminated before such containers leave the site for return to service. There will therefore be no extension of the area of contamination.

COMMENT: There are no details relating to the maintenance procedures for contaminated items such as hydraulic press dies.

HEALTH DEPARTMENT RESPONSE:

Detailed operational and maintenance procedures will be developed as the design of the facility proceeds. These procedures will certainly contain decontamination methods and monitoring to ensure that PCB contamination has been removed from items such as hydraulic press dies which will require maintenance.

COMMENT: The contamination of ground water and streams due to the leakage of radioactive wastes and dusts.

HEALTH DEPARTMENT RESPONSE:

Contamination of ground water by radioactive wastes will be virtually zero. Preliminary drilling carried out on the preferred third site has shown that there is no recoverable ground water between the surface and the bedrock granite. As the evaporation rate is 2800 mm per annum and the deposition rainfall rate is 280 mm

per annum, it is expected that no rainfall will penetrate through the wastes to get to any ground water. It is expected that the rainfall will evaporate out of the ground before penetrating down to bedrock. In this respect, the proposed sites have some of the best geological and hydrogeological characteristics for such burial in the world. There will be no leakage of radioactive dusts. The procedures for the handling and emplacement of radioactive wastes will ensure that no radioactive dusts can be generated. They will therefore not be available to contaminate groundwater or any other adjacent areas.

COMMENT: Concern was expressed by apiarists that utilise the floral resources in the area regarding the effects of contamination on these and aviaries.

HEALTH DEPARTMENT RESPONSE:

There will be no radioactive contamination on bees and aviaries. There will be no contamination which will in any way have an influence on the floral resources in the area. Environmental monitoring for PCB and organo-chlorine levels will be carried out before the establishment of the facility, during and after its operation. This monitoring will be done on a regular basis to ensure that there are no effects of contamination on the floral resources or on bees and aviaries. The Health Department will be very pleased to carry out monitoring on samples of honey produced by bees in this area to extend its monitorning data base.

COMMENT: The extent of movement of radioactive gases and airborne dust particles is unknown and there is concern that contamination of local flora and wheat areas may result.

HEALTH DEPARTMENT RESPONSE:

Should the Environmental Protection Authority give approval to proceed with the establishment of the Integrated Waste Disposal Facility, the early environmental measurements to be carried out prior to establishment will include obtaining detailed data on the micro-meteorology of the area. Monitoring of the both the local area and of more remote areas, including the wheatlands, will be carried out to determine pre-operational levels of concentration of various contaminants. This monitoring will be continued throughout and after the operation of the facility to confirm that operation of the facility will not lead to any contamination of either local flora and the agricultural areas.

COMMENT: The cumulative effects in the region of both PCBs and sulphur dioxide.

HEALTH DEPARTMENT RESPONSE:

It is known that there are approximately 1000 tonnes of PCBs in storage requiring disposal. The efficiency of the incinerator is 99.9999%, which means that for each tonne of PCB which is burnt, there could be a maximum discharge from the secondary chamber of 1 gram of PCB. The outlet from the secondary chamber of the incinerator will go through a scrubbing system to remove the hydrogen chlorides and other contaminants. This will also remove some of the small fraction of PCBs which may be in the discharge gases from the secondary chamber. Thus the potential emission to atmosphere of unburnt PCBs will be considerably less than 1 gram per tonne of PCB incinerated. This means that the total cumulative emission from combustion of the total West Australian stocks of PCBs over the three to five year period required for total destruction will be less than 1000 grams of PCBs. It is anticipated that it will be extremely difficult to measure any increase above pre-existing levels of PCBs at the boundary of the facility and certainly not at the boundary of the 15 km exclusion zone. There will be no sulphur dioxide emitted from the incinerator as the feed materials will not contain sulphur. In the event of any being generated, it will be removed in the scrubber which follows the secondary chamber of the incinerator.

COMMENT: Radioactive contamination of the food chain and the potential for contamination of humans and other higher order consumers.

HEALTH DEPARTMENT RESPONSE:

The major advantage of the sites proposed for the Integrated Waste Disposal Facility is that the geological and hydrogeological characteristics of the area virtually preclude any contamination of any food chain and hence, virtually zero potential for contamination of either humans or any other higher order consumers.

COMMENT: No detail is provided regarding the monitoring of the facility after closure.

HEALTH DEPARTMENT RESPONSE:

It is intended that monitoring of the facility will continue as long as there is a government in WA. The PER contains commitments for monitoring to be carried out continuously during the operation of the facility.

COMMENT: The noise levels of the site need to be addressed.

HEALTH DEPARTMENT RESPONSE:

Noise levels on the site and in the incinerator plant will form an essential component of the detailed design of the facility. However, due to its size, it can be guaranteed that noise levels will be well within the allowed occupational limits.

The Incinerator

COMMENT: Random sampling of the flue emission is a technological anachronism as a method of monitoring the same.

HEALTH DEPARTMENT RESPONSE:

The most important performance standard of the incinerator is the combustion efficiency. This is calculated by measuring the emission of CO_2 and CO using the formula:-

$$CE\% = \frac{\text{conc of } CO_2}{\text{conc of } CO_2 + \text{conc of CO}} \times 100$$

Co and CO_2 emissions will be continuously monitored.

The incinerator design incorporates automatic shutdown of the chemical feed if these emissions deviate from the established parameters.

Once the combusion efficiency has been established, incineration of PCBs at 1200^{o}C with a 2 second well time and 3% excess oxygen provides for a destruction and removal efficiency of 99.9999%. Regular sampling for PCBs in the flue emission will confirm this DRE.

COMMENT: No indication is given as to flue emission monitoring percentages.

HEALTH DEPARTMENT RESPONSE:

The Health Department provides details on pages 35 and 36 of the PER of the maximum incinerator emissions which will not be exceeded. This data is provided in a form which is recognised by emission monitoring organisations world wide.

COMMENT: There are no reliable methods which exist to measure or monitor incinerators (Greenpeace Toxics 1987).

HEALTH DEPARTMENT RESPONSE:

Detailed design of the incinerator will include continuous monitoring of the flue gases. There will be automatic shut down of the feed to the incinerator should any parameter move outside its pre-set limits. Great care will be taken to ensure that the full characteristics of feed to the incinerator are known in detail before they are introduced into the incinerator for combustion. Because the facility will be owned and operated by the Health Department, there will be no commercially oriented short cuts taken in respect to the feedstock being incinerated.

COMMENT: No exact details of monitoring regularity are stated in the report.

HEALTH DEPARTMENT RESPONSE:

Commitments for continuous monitoring have been given in the PER. Exact details of other monitoring procedures will be developed in conjunction with the detailed design of the facility and as determined by the Control and Community Liaison Committees.

COMMENT: It is considered unacceptable to determine the destruction and removal efficiency of the incinerator using only one trial burn.

HEALTH DEPARTMENT RESPONSE:

There will be many trial burns commencing with the destruction of non-chlorinated materials. When successful, trial burns will be conducted using non-PCB organo-chlorines. Only after successful conclusion of these trials will PCB trial burns be conducted.

This is the accepted method for commissioning high temperature incinerators.

COMMENT: Monitoring should be carried out during the normal operation of the facility.

HEALTH DEPARTMENT RESPONSE:

Monitoring will be carried out during the normal operation of the facility as a part of the routine functions.

COMMENT: There is a need for clarification of how a combustion efficiency of 99.9% for the proposed facility relates to the standard of 99.9999% destruction of PCBs developed by US agencies.

HEALTH DEPARTMENT RESPONSE:

The combustion efficiency is the most important operational parameter for the incinerator. This is calculated by measuring the concentrations of carbon dioxide and carbon monoxide in the flue emissions.

Maintenance of the PCB in the incinerator for a 2 second dwell time at 1200°C (±100°C) and 3% excess oxygen in the stack gas at a combustion efficiency of 99.9% provides for a 99.9999% destruction and removal of PCB.

MANAGEMENT OF THE FACILITY

COMMENT: It was suggested that a detailed Waste Management Programme be submitted to the Radiological Council, IMRC and other bodies, which would include an operations manual, a maintenance manual, detail of the emergency procedures, a radiation management plan, conceptual plans for decommissioning of the plant, rehabilitation etc, institutional contacts.

HEALTH DEPARTMENT RESPONSE:

All of these requirements will be addressed during the detailed design of the facility. The Control Committee which is identified in the PER will consist of experts in the above fields as well as other areas. This Committee will ensure that all procedures have been fully developed and tested prior to operation of the facility. The facility will require registration with various government agencies and will have to satisfy their requirements prior to operations commencing. During routine operation of the facility, it will be subject to surveillance and inspection by representatives from various government agencies and will have to comply with their requirements.

COMMENT: Concern was expressed regarding the enforcement of the regulations governing the facility and the possibility of complacency with time.

HEALTH DEPARTMENT RESPONSE:

The legislation which will be enacted to cover the proposed facility will require submission to Parliament of an annual report. This annual report will provide details of compliance with all the regulations and with conditions governing the operation of the facility as well as all details concerning accidents or incidents which have occurred during the previous twelve months. The facility will also be subject to surveillance and inspection by government agencies not related to the Health Department and will have to comply with their

requirements. All details will need to be provided in the annual report to the Parliament. Because this will be a public document, it will be open to public scrutiny to ensure that the highest standards have been maintained.

COMMENT: Provision should be made for the prosecution of the Health Department for any breach of regulations.

HEALTH DEPARTMENT RESPONSE:

Because the operation of the facility will be subject to independent surveillance and inspection, the operators of the facility will not be immune from prosecution for breaches of the conditions of operation. The operation of the facility will be subject to the same or greater degree of surveillance than that which would apply to other enterprises within the state of Western Australia.

COMMENT: The records of the facility should be available for publication and evaluation by an independent authority.

HEALTH DEPARTMENT RESPONSE:

The records of the facility will be available for publication and the information will be contained in the annual report which will have to be presented to Parliament each year. There will be independent evaluation throughout the year arising from surveillance and inspection by government agencies not related to the Health Department. Full details will be contained in the annual report which will be a public document. Regular reports throughout the year will be submitted to the Control and Community Liaison Committees.

COMMENT: Management of the facility should be in consultation with the EPA and recognised local environmental groups. The former should have the funds and power to control the management of the facility.

HEALTH DEPARTMENT RESPONSE:

The government has determined that the ownership and operation of the facility will be by the Health Department. The environmental and operational conditions will be set by the Environmental Protection Authority. The EPA will have authority to carry out site inspections and measurements at any time when it sees fit. The PER has made a commitment that the Control Committee will govern the design and operation of the facility. It will incorporate representatives from the local areas. The Community Liaison Committee will comprise representatives of local environmental

groups as well as members of local government etc. The Health Department wishes to keep local environmental groups fully informed about the operation of the facility and will gladly seek their involvement.

COMMENT: Concern was expressed that the records will not be available to the public on an ongoing basis.

HEALTH DEPARTMENT RESPONSE:

On page 49 of the PER, the Health Department commits itself to the preparation of annual reports for Parliament and for an initial five year period, for submission to the EPA, on the environmental management and monitoring commitments given in the PER. Page 16 of the PER details the enabling legislation which is proposed to govern the setting up and operation of the facility. The commitment is made in this section of the PER that the Minister for Health will table in Parliament with the Health Department's annual report. It will include a report covering operation of the Integrated Waste Disposal Facility for the previous financial year. The annual report will include listings of wastes burnt or buried and an auditor's statement that proper records have been kept; a report on the operation of the plant and its maintenance as well as reports on accidents and incidents. This information will be publicly available each year.

COMMENT: There should be provision for a full time, qualified safety officer employed on site with radiation experience.

HEALTH DEPARTMENT RESPONSE:

There will be.

SOCIAL AND ECONOMIC IMPACTS

COMMENT: The negative impact the facility will have on tourism in the goldfield region due to the public's fear of the health risks associated with the disposal of hazardous wastes.

HEALTH DEPARTMENT RESPONSE:

The proposed facility is remote from the normal tourism areas in the goldfields and is not accessible by normal tourist means. It is most unlikely that the average tourist will even be aware that such a plant exists within the Yilgarn/Coolgardie region. Because this facility will be unique, not only in Western Australia, but in Australia, it will almost certainly generate a tourist traffic of its own. The Health Department anticipates that once the facility is in operation

there will eventuate a demand for regular tourist tours over the facility and it would be the department's intention to accommodate such tours.

CONTINGENCY PLANNING

COMMENT: No contingency plan exists for the evacuation of the goldfields population centres and residents who live along the transport route in the event of a catastrophic accident.

HEALTH DEPARTMENT RESPONSE:

Emergency procedures for the transport of hazardous materials already exist. They include contingency plans for evacuation.

These procedures will be further developed to specifically deal with the wastes to be dealt with at the facility.

COMMENT: There will be a greater pressure and risk placed on emergency services.

HEALTH DEPARTMENT RESPONSE:

Appropriate emergency response plans have been and will be further developed and in place prior to transport of the first load of waste for disposal. The wastes will be transported under such conditions that there will be no immediate pressure placed upon emergency services by virtue of the risk posed by the wastes being transported in the event of accident.

COMMENT: There is a need for contingency planning (eg. spillages, emergencies) to be discussed with local residents.

HEALTH DEPARTMENT RESPONSE:

The PER makes a commitment that the design and operation of the facility will be under the direction of an expert Control Committee. There will be local representatives on this Control Committee. There will also be appointment of a local Community Liaison Committee which will be responsible for disseminating and receiving information from local residents. It is the Health Department's intention that all persons be informed prior to the operation of the facility commencing.

COMMENT: There is a need for Western Australian Fire Brigades and volunteers to be trained in the handling of PCBs and radioactive wastes.

HEALTH DEPARTMENT RESPONSE:

An undertaking has been given that this will take place.

COMMENT: Concern was expressed over the time it would take for a body of people (EPA or Health Department) to reach the site of an emergency or accident.

HEALTH DEPARTMENT RESPONSE:

The conditions under which waste will be transported to the Integrated Waste Disposal Facility will be such that there should be no immediate requirement for attendance at the site of any emergency by personnel from the EPA or the Health Department. The emergency procedures will involve the local emergency response people and they will receive appropriate training prior to the transport of wastes commencing.

COMMENT: The Regulations and Codes of Practice should be detailed in the PER.

HEALTH DEPARTMENT RESPONSE:

These sources were detailed in the PER and were nominated on pages 1 and 4 of the PER.

COMMENT: There is no detailed planning for accidental spillages during transport.

HEALTH DEPARTMENT RESPONSE:

Emergency procedures for transport accidents involving hazardous materials are already in place. Planning for accidents and emergencies will be further developed during the detailed planning of the facility. Specific emergency response procedures will be in place prior to transport of the first shipment of wastes for disposal.

COMMENT: It was considered that a specific hazard and risk analysis which is not restricted to the size of the facility is required.

HEALTH DEPARTMENT RESPONSE:

Hazard and risk analyses always take into account the size of the facility and its components, including the particular risks associated with individual components of equipment and their contents. It is considered by experts in risk assessment that due to the size of the facility, a risk assessment will not add further information to the potential dangers of the plant as the accepted risk of one in a million will be reached well within the facility boundary.

COMMENT: In the event of a venturi scrubber failure, no indication is given of the time it would take to identify the failure, the extent of acid gas emission and procedures for shutting down of the incinerator.

HEALTH DEPARTMENT RESPONSE:

A venturi scrubber failure will be indicated instantaneously by a rise in temperature downstream. This will result in immediate feed shut-off.

COMMENT: There is no contingency planning for emission levels being exceeded or if leaching of radioactive waste to the environment is found to have occurred.

HEALTH DEPARTMENT RESPONSE:

Emission levels from the incinerator will be continuously monitored and the feed of wastes will be immediately cut off in the event that any of the monitoring parameters exceeds the set points. Part of the environmental monitoring for the radioactive waste will include the location of monitoring bores around the burial sites. However, as there is no available ground water at the preferred site, it is unlikely that there will be any leaching of radioactive wastes at all.

COMMENT: Training programmes for workers should be established to satisfy the requirements of the Departments of Health and Mines.

HEALTH DEPARTMENT RESPONSE:

Training programmes will not only satisfy the requirements of the Departments of Health and Mines but also the requirements of the Department of Occupational Health Safety and Welfare. This is an integral part of the design phase of the project.

COMMENT: In view of the toxic and flammable nature of the chemicals to be disposed of at the site, it is considered a serious omission that no fire break for the facility is mentioned.

HEALTH DEPARTMENT RESPONSE:

The incinerator facility will be located within its own perimeter fence inside the main fence of the establishment. There will be a fire break around the incinerator facility and great care will be taken during the detailed design of the facility to counter problems from fire.

COMMENT: There are no details specified for a fire prevention system.

HEALTH DEPARTMENT RESPONSE:

Details of fire prevention systems are provided on page 27 of the PER. The detailed design of the incinerator facility will include provisions for containment and control of fires.

COMMENT: There is the potential for sparks from angle grinders to ignite flammable and explosive material.

HEALTH DEPARTMENT RESPONSE:

The design of the facility will take into account the need to prevent fire. The working procedures which will be developed by the control committee as the design proceeds will cover safety aspects such as the production of sparks from devices like angle grinders.

MONITORING

General

COMMENT: Regular monitoring programmes should include monitoring of the soil, flora, ponding water and surface discharge and that monitoring should not be restricted to the site, but include a greater area.

HEALTH DEPARTMENT RESPONSE:

All of these aspects have been taken into account.

COMMENT: An independent body should be responsible for monitoring.

HEALTH DEPARTMENT RESPONSE:

Operation of the facility will have to comply with all appropriate government regulations and any criteria imposed by the EPA. Regular independent monitoring has been promised.

COMMENT: The transport route should be monitored both before and during the operation of the facility.

HEALTH DEPARTMENT RESPONSE:

It will be.

COMMENT: The development of the facility will encourage other noxious industries to be located in the region.

HEALTH DEPARTMENT RESPONSE:

The legislation which will be enacted to cover the setting up and operation of the Integrated Waste Disposal Facility will prohibit any other development occurring with the 15 kilometre exclusion zone around this facility.

COMMENT: The ongoing financial liability to the taxpayers of the State for millions of years to monitor the facility and maintain the wastes in a safe condition.

HEALTH DEPARTMENT RESPONSE:

The design of the burial trenches will be such that once the wastes are properly emplaced and covered, there will be a minimum or zero maintenance required into the foreseeable future. However, it is intended that the waste producers who dispose of their waste at this facility will pay a fee which includes components to cover the ongoing operations and monitoring of the facility for the foreseeable future. It therefore should not impose a financial liability on the taxpayers of the State.

COMMENT: The potential for the contamination of primary produce in the area and the subsequent refusal of local and overseas consumers to purchase the produce.

HEALTH DEPARTMENT RESPONSE:

The concern expressed by primary and agricultural producers about the perceived risk to sales of their produce posed by the setting up of this facility was acknowledged by the Health Department soon after the release of the PER. For this reason, the Health Department accepted the advice of the local shires and concerned groups to seek a more remote site, and this has been done. The preferred third site is now indeed remote from agricultural pursuits and habitation. The environmental monitoring programme which will monitor both the pre-operational and operational phases of this facility will include measurements of local agricultural produce as well as normal environmental samplings. Countries with agricultural exports of similar importance to Australia has disposal facilities for similar wastes without this problem arising.

COMMENT: The fear of radioactive contamination will have a negative impact on land values of the surrounding areas.

HEALTH DEPARTMENT RESPONSE:

Timberfield Station is the only surrounding occupied pastoral lease in the area near the preferred third site. The Health Department has been in close contact with the owner of the pastoral lease for this station and will ensure that he does not suffer any financial deprecation as a result of the establishment of the Integrated Waste Disposal Facility.

COMMENT: The decision to site a potentially dangerous industry in the area is short sighted in view of the fact that the goldfields region is developing into a major population centre.

HEALTH DEPARTMENT RESPONSE:

The preferred third site for the Integrated Waste Disposal Facility is truly remote from both agricultural pursuits and habitation centres. It is located approximately 80 kms north east from Koolyanobbing, 110 kms north west from Coolgardie, and 60 kms north from the east-west railway line. It is an area of vacant Crown land and it is most unlikely that any population growth could extend to this truly remote area in the foreseeable future.

COMMENT: There is the need for a tax on the companies that produce waste.

HEALTH DEPARTMENT RESPONSE:

The Integrated Waste Disposal Facility will operate on a fee recovery basis. A component of the fee will essentially form a tax that will provide monies to cover the ongoing monitoring and maintenance.

Prepared by: The Health Department of WA in association with the Geological Survey of the Mines Department.

30 August 1988

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