

Remediation of the OMEX Contaminated Site — Bellevue

**Waste Management Division of the
Department of Environmental Protection**

**Report and recommendations
of the Environmental Protection Authority**

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Summary and Recommendations

Project Overview

The Waste Management Division of the Department of Environmental Protection (the Proponent), proposes to remediate the contaminated lands of the OMEX site located between Clayton Street and Purton Place in Bellevue, WA. The Proponent has assumed responsibility for remediating the contamination caused by the previous operator of the site, Western Oil Refining Company.

This Report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for the Environment (the Minister) on the environmental factors relevant to the proposal.

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

Relevant Environmental Factors

Although a number of environmental factors were considered by the EPA in the assessment, it is the EPA's judgement that the following are the environmental factors relevant to the proposal, which require detailed evaluation in the Report:

- (a) Waste Pit and Soil Remediation;
- (b) Air Emissions (including odour, dust and particulates and chemical emissions);
- (c) Groundwater;
- (d) Surface Water;
- (e) Noise and Vibration;
- (f) Social Surroundings (including Transport and Community Consultation); and
- (g) Other Issues (including Future Land Use and Fate of Wastes).

In the past, a portion of the contaminated materials at the OMEX site was transported to the nearby Adelaide Street Landfill for disposal. The Proponent has committed to address the Omex-related contamination at the Adelaide Street Landfill at a later date, once the materials are accessible to removal.

Conclusion

The EPA has considered the proposal by the Proponent to remediate the OMEX site. The EPA notes that the proposal presents a positive effort in returning otherwise contaminated and sterile land to a fit and proper state for residential use. Although several restrictions have been identified within this Report, they can be overcome by appropriate preparation and planning (as outlined in the staged implementation program) and by attention to detailed management systems.

The EPA has concluded that the remediation proposal can be managed in an environmentally acceptable manner and will result in an environmental benefit.

Recommendations

The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister notes that the project being assessed is for the rehabilitation and remediation of land contaminated by the improper storage/disposal of waste oil from an oil re-refining operation. This site is located within a mixed residential and commercial use area and represents an on-going risk to the health and well-being of the surrounding community and environment. After remediation the land will be redeveloped in accordance with the Western Australian Planning Commission Improvement Plan No. 30 and be suitable for residential purposes.
2. That the Minister considers the report on the relevant environmental factors as set out in Section 3.
3. That the Minister notes that the EPA has concluded that the remediation proposal will result in environmental benefit and can be managed to meet the EPA's environmental objectives, provided that the Proponent's Commitments and the Proposed Environmental Conditions are implemented.
4. That the Minister imposes the conditions and procedures recommended in Appendix 5 of this report.

Proponent's commitments

The Proponent's commitments as set in the CER and subsequently modified, as shown in Appendix 5, should be made enforceable through the environmental conditions.

Recommended conditions

Having considered the Proponent's commitments and the information provided in this Report, the EPA has developed a set of conditions, which the EPA recommends be imposed if the proposal by the Waste Management Division of the Department of Environmental Protection to remediate the OMEX site, is approved for implementation.

During the assessment process, the EPA decided that a two stage approach for the remediation would be appropriate. Stage 1 would include the trial excavation program to characterise the wastes and Stage 2 would include undertaking the full scale remediation program. This allows the EPA to review the outcomes of the trial excavation prior to the Proponent proceeding with full remediation, and allows the recommendation of changes in actions in relation to the implementation of Stages 1 and 2 to the Minister for the Environment following consideration of the Dioxin testing results requested by the EPA. Implementation of Stage 2 will not take place until the requirements of Stage 1 have been adequately fulfilled.

The conditions are presented in Appendix 5.

The Proponent for this proposal is the Waste Management Division of the Department of Environmental Protection (DEP). The DEP traditionally provides a service to the EPA in undertaking the assessment process. For this assessment it has been necessary to create a different arrangement to ensure that there was no conflict of interest between the Proponent and the services required by the EPA. This alternative arrangement for the assessment of this proposal is outlined in three flow diagrams, which are provided in Appendix 1.

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1. Introduction

The Waste Management Division of the Department of Environmental Protection (the Proponent), proposes to remediate the contaminated lands of the OMEX site located between Clayton Street and Purton Place, Bellevue (Figures 1 and 2).

From 1955 to 1979 the Western Oil Refining Company operated an oil re-refining plant at the OMEX site. The processes performed at the site included the treatment of waste lubricating oils with concentrated sulphuric acid to remove non-oil materials and unstable oil. The waste generated by this operation included bituminous sludge, oily residues and acidic wastewater. These materials were disposed of in an unlined and disused clay borrow pit. Subsequently, a purpose-built pit for disposal of wastes was located at the site (also unlined).

The re-refinery buildings were demolished in 1979 to make way for an oil blending and re-packaging facility. From 1976 onwards the waste pits at the site were progressively backfilled with building rubble, sand, plaster wastes, car bodies and drums. Overflows from the major waste pit during 1988/1989 directly impacted upon adjoining Lots 51 and 52 along Henkin Street (Figure 2). These lots were subsequently 'cleaned-up', with approximately 1000m³ of waste oil sludge and soil removed to the nearby Adelaide Street Landfill in Hazelmere for disposal.

Several environmental investigations have been undertaken at the OMEX site since the overflows documented in 1988 (CER, Table 4 p12). An impervious HDPE plastic liner was placed over the major pit in February 1996. A contoured sand cover lies under the liner, providing run-off to a sump located on Lot 61, Purton Place.

On October 1997 the Premier of WA announced that funds would be made available for remediation of the OMEX site.

The Environmental Protection Authority (EPA) required the Proponent to prepare environmental review documents [Consultative Environmental Review (CER) level of assessment] so as to:

- place the proposal in the context of the local/regional environment;
- explain the issues, decisions and alternatives which led to the development of this proposal (at this place and at this time);
- set out the specific environmental impacts that the proposal might have;
- address each impact to define how the Proponent would avoid, mitigate or ameliorate that impact; and
- ensure that remediation of the site is carried out to a standard appropriate for the intended residential land-use.

Further details of the proposal are presented in Section 2 of this Report. Section 3 discusses environmental factors relevant to the proposal. The conditions and procedures to which the proposal should be subject, if the Minister determines that it may be implemented, are set out in Section 4. Section 5 provides Other Advice by the EPA. Section 6 presents the EPA's Conclusions and Section 7, the EPA's Recommendations.

The Proponent for this proposal is the Waste Management Division of the Department of Environmental Protection (DEP). The DEP traditionally provides a service to the EPA in undertaking the assessment process. For this assessment it has been necessary to create a different arrangement to ensure that there was no conflict of interest between the Proponent and the services required by the EPA. This alternative arrangement for the assessment of this proposal is outlined in three flow diagrams which are provided in Appendix 1.

A list of people and organisations that made submissions is included in Appendix 2 and References are provided in Appendix 3. A summary of the assessment of the Relevant Environmental Factors (Table 3) is provided in Appendix 4. Recommended Conditions and the Proponent's Consolidated Commitments are provided in Appendix 5.

Appendix 6 contains a summary of the public submissions and the Proponent's response to each question. The summary of public submissions and the Proponent's responses are included as a matter of information only and do not form part of the EPA's report and recommendations. However, the EPA has considered issues raised in public submissions during the identification and assessment of the relevant environmental factors.

2. The Proposal

The OMEX site is located within the Perth suburb of Bellevue and includes the lands between Purton Place and Clayton Street (Figure 1). This area encompasses Lots, 48 to 58 and Lots 60 to 61 (Figure 2). Neighbouring residential and commercial properties are located adjacent to, or directly opposite, the OMEX site (Figure 2).

Of the six remediation options considered by the Proponent, landfill disposal, incorporating pre-treatment with an alkaline material (neutralising agent), was deemed the most appropriate (CER Section 5.0). This preferred approach to site remediation is to be undertaken within two separate phases, Phase I - Containment (completed) and Phase II - Remediation (Figure 3). A detailed explanation of the proposed remediation approach is also presented within Section 6.0 of the CER.

Phase I - Containment

The Containment Phase at the OMEX site has been completed and was implemented at the OMEX site under a public works order in an attempt to isolate the impacted groundwater and limit continuing impact upon the local aquifer systems beneath the site. A sub-surface barrier now surrounds the major waste pit and extends from the surface to the upper confining clay layer of the Lower Leederville Formation (LLF). This wall has effectively 'isolated' the waste materials in the Major Pit from the environment and has minimised ongoing groundwater impacts.

Phase II - Remediation

The implementation of Phase II will be carried out in two stages. Stage 1 will be the performance of a trial excavation program to obtain sufficient field data regarding the proposed remedial method. Information obtained from Stage 1 as well as from tests being undertaken for the presence of Dioxin will be used to identify/modify those procedures associated with implementation of the full-scale remedial program (Stage 2).

Prior to excavation for Stage 2 implementation, the major pit within the containment barrier will be de-watered. The liquid level (liquid wastes and contaminated groundwater) will be removed to a depth of approximately 10 m below the ground surface (mbgs). It is estimated that about 4400m³ of this liquid material will be treated on-site to adjust pH before being transported off-site to the Forrestdale Liquid Waste Treatment Facility.

Once excess liquids have been removed from the site and materials become spadeable the solid wastes will be excavated, treated (as required) and removed for off-site disposal. Continuous liquid waste sumps will operate within the pit to manage the seepage of liquids into the open excavations. The facility selected for off-site disposal will be determined based on the results of waste characterisation and on-site treatment.

After site validation the excavated pit(s) will be backfilled with clean materials up to a depth of 3.5 mbgs. This remaining void will be backfilled with compacted clay in order to allow future property development.

A summary of the key characteristics of the proposal is presented in Table 1. A detailed description of the proposal is provided in Section 6.0 of the CER (Waste Management Division-DEP, 1999).

Table 1: Summary of key proposal characteristics

Element	Description
Project Name	Remediation of the OMEX Contaminated Site, Bellevue
Site Location	The OMEX remediation site is defined as comprising Lots 57, 58 and 60 Clayton Street, Lot 61 Purton Place and Lots 48 to 56 Henkin Street, Bellevue. Portions of the adjacent Lots 130 Purton Place and 136 Clayton Street may be remediated based on the results of the validation sampling performed during remediation and the source of the contaminants identified.
Approach to Remediation	Excavation, treatment and off-site disposal of both solid and liquid wastes in a manner which will adequately manage the risks and outcomes of the remediation process and remediate the site to a standard appropriate to the intended residential land-use.
Pit Remediation	Wastes from the OMEX pits will be removed and augmented with a neutralising agent to reduce acidity before being transported off-site. All waste materials will be removed from the waste pits. It is estimated that the wastes are present to an average depth of approximately 7 mbgs.
Soil Remediation	Soil surrounding the OMEX pits will be excavated to a maximum depth of 3.5 mbgs. Guideline criteria will be used to assess/validate the walls and floors of the resulting voids.
Groundwater Remediation	The groundwater itself will not be the subject of a dedicated remediation program. The previously approved construction of a bentonite containment wall has separated off the waste pits from the surrounding aquifer materials. The containment wall has been keyed into the upper confining layer of the LLF. Modelling of the movement of the groundwater plume beneath the OMEX site has delineated the expected impact to surrounding users and the natural environment.
Airborne Emissions	The gases released from the waste materials and remediation processes will be managed to prevent the potential for the gasses to cause nuisance or represent a human health risk.
Transportation of Wastes	Wastes from the OMEX site will be transported in either solid or liquid forms to an appropriate facility. The impact of increased heavy vehicular transport and the risk of accidental release to the environment from spills will be adequately managed by the Proponent.
Environmental Management	<p>The Proponent has identified several factors which they will manage during the proposed project:</p> <ul style="list-style-type: none"> • nuisance odours; • chemical vapours; • dust and noise emissions; • vibration from machinery; • handling of waste materials (stockpiling, etc.); • transport of contaminated waste and soil; • stabilisation of earth works; • control of surface run-off; • increased traffic volumes; • public and worker safety; and • site security.

Element	Description
Environmental Supervision	<p>The successful remediation contractor will provide a dedicated site superintendent. This superintendent will ensure that:</p> <ul style="list-style-type: none"> • waste transport records are maintained; • plant and machinery are fit for purpose and strict de-contamination procedures are followed; and • environmental monitoring and reporting is undertaken as required.
Environmental Auditor	<p>An independent auditor will be appointed by the EPA to verify the success of the site remediation by inspecting works and reviewing analytical results.</p>

Since release of the CER, the Proponent has made a number of modifications to the proposal. These include:

- The Proponent has agreed to test for Dioxins as a preventative measure on the basis of limited site specific data. The EPA will consider the results of the trial excavation program in conjunction with the results of the Dioxin testing.
- The Proponents application to commence trial excavations at the OMEX site has been rejected by the EPA. The results of trial excavations will now be performed as Stage 1 of the Proposal.

In addition, during the EPA Briefing, the Proponent committed to the following:

- Any OMEX waste identified outside the pit areas will be remediated to a depth of 3.5m; and
- Preparation of a Transport Management Plan to include liaison with the Bellevue Primary School in addition to Main Roads WA.

Prior to Stage 1, the Proponent will be performing Dioxin sampling and will provide the results of this sampling to the EPA. The EPA may recommend to the Minister for the Environment changes in action in relation to the implementation of Stages 1 and 2 following consideration of the Dioxin testing results requested by the EPA.

The potential impacts of the proposal and the identification of the relevant factors are summarised in Table 2.

3. Relevant Environmental Factors

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and the conditions and procedures, if any, to which the proposal should be subject. In addition, the EPA may make recommendations as it sees fit.

Having considered appropriate references, public and government submissions and the Proponent's response to submissions, in the EPA's judgement, the following are the environmental factors relevant to the proposal:

Pollution

- Surface water;
- Groundwater;

Table 2: Identification of Relevant Environmental Factors

FACTOR	PROPOSAL COMPONENT WITH POSSIBLE IMPACT	GOVERNMENT AGENCY AND PUBLIC COMMENTS	IDENTIFICATION OF RELEVANT ENVIRONMENTAL FACTORS
POLLUTION			
Surface Water	Risks associated with the management of surface water drainage both during and upon completion of the remediation project.	<p>Government Agencies: The WRC noted that waste stockpiles should be properly bunded and runoff collected in lined ponds for reuse or treatment and disposal. Liquid wastes should be handled so as not to create secondary contamination problems.</p> <p>The DEP is concerned about the management of surface water runoff, post remediation.</p> <p>Public: Further public submissions regarding surface water management raised the following issues:</p> <ul style="list-style-type: none"> • Leachate management (treatment and stockpiling). • Surface water segregation. • Contaminated waters retained on-site. • Surface water monitoring. • Surface drainage post remediation. 	Considered to be a relevant factor requiring further EPA evaluation.
Groundwater	Groundwater at the OMEX site is known to be contaminated. Modelling of the plume has identified that contamination will spread down hydraulic gradient of the OMEX site. The removal of contaminated waste materials and installation of the containment will aid in ameliorating impact to surrounding groundwater systems.	<p>Government Authorities: The WRC noted that the containment wall has significantly enhanced the amelioration of groundwater. On-going monitoring will be required to demonstrate integrity of the wall. WRC support that remediation of groundwater is not warranted given that contaminant sources will be removed and the main source has been isolated. Monitoring of the bores both on and off the OMEX site is required. The WRC will not allocate new licenses within the vicinity of the OMEX site.</p> <p>HDWA indicate that a health risk assessment for groundwater contamination may not be required so long as the WRC place restrictions on use and monitoring continues into the future to establish change.</p> <p>CSIRO stated that further description of the aquifer systems may be required to define possible leakage between the Upper and Lower Leederville Aquifers. Long term monitoring of groundwater should be undertaken to ensure that the containment wall is effective.</p>	Considered to be a relevant factor requiring further EPA evaluation.

FACTOR	PROPOSAL COMPONENT WITH POSSIBLE IMPACT	GOVERNMENT AGENCY AND PUBLIC COMMENTS	IDENTIFICATION OF RELEVANT ENVIRONMENTAL FACTORS
		<p>Public: The Bellevue Action Group expressed the opinion that insufficient discrimination of the extent and severity of on and off-site groundwater contamination was reflected in the CER, to the extent that they believed it was inaccurate.</p> <p>Further public submissions regarding groundwater raised the following issues:</p> <ul style="list-style-type: none"> • Long term groundwater monitoring/management. • Integrity of the bentonite containment wall. • Restrictions to groundwater usage. • Human health risks to groundwater exposure. • Hydrogeological systems have not been adequately defined. 	
Odour	<p>It is expected that the remediation of the OMEX waste materials will result in the generation of odours.</p> <p>The waste materials at the OMEX site are dominated by the presence of hydrocarbon and sulfur compounds (hydrogen sulphide), which have the capacity to release odours.</p>	<p>Government Agencies: The Shire of Swan considered odour as a key factor in addressing public perceptions of the proposal.</p> <p>HDWA considered that odours are likely to be emitted from the site and that public perceptions require management. The HDWA stated that nuisance odours do not necessarily mean unsafe levels.</p> <p>DEP indicated that OMEX was prosecuted under the Health Act for offensive odours in 1979.</p> <p>Public: Submissions from the public focused on the issue of odour with regard to chemical emissions, human health and community consultation. Specific objections to odours or odour generation were not received.</p>	<p>Considered to be a relevant factor requiring further EPA evaluation. (Evaluated under Air Emissions in Table 3)</p>
Dust and particulates	<p>The excavation, treatment, stockpiling and transport of contaminated materials from the OMEX site has the capacity to generate dust emissions.</p> <p>Dust is likely to contain contaminants originating from the OMEX waste.</p>	<p>Government Agencies: DEP required reporting of monitoring results on a regular basis.</p> <p>HDWA has indicated that dust and particulate alert and action levels are unrealistic. A detailed air-monitoring program will need to be produced based upon trial excavations and field data. Additional chemicals other than</p>	<p>Considered to be a relevant factor requiring further EPA evaluation. (Evaluated under Air Emissions in Table 3)</p>

FACTOR	PROPOSAL COMPONENT WITH POSSIBLE IMPACT	GOVERNMENT AGENCY AND PUBLIC COMMENTS	IDENTIFICATION OF RELEVANT ENVIRONMENTAL FACTORS
	<p>These particulates will require monitoring and management.</p>	<p>those previously identified may need to be tested. On the basis of literature review and known site history the HDWA have identified the issue of Dioxins as being of minimal risk to human health.</p> <p>Public: The Bellevue Action Group indicated the presence of elevated dust levels at 110 Clayton Street during the installation of the containment wall.</p> <p>Dingle & Bird Environmental Pty Ltd suggest that the fine particulates alert and action levels would often be exceeded and that monitoring systems and response levels, as proposed, would be unlikely to provide assurance to the adequate protection of human health.</p> <p>MPL Group Pty Ltd has considered that current information is inconclusive and monitoring as proposed is below typically applied standards.</p> <p>Further public submissions regarding dust and particulates raised the following issues:</p> <ul style="list-style-type: none"> • Monitoring. • Human health effects. • Stockpile management. • Dust suppression. • Mobilization of particulate contaminants (heavy metals, Dioxins, PAHs etc.). 	
Chemical Emissions	<p>The progressive exposure, excavation, handling and treatment of the wastes at the OMEX site will cause the generation of fugitive emissions.</p> <p>It is anticipated that these will include volatile and semi-volatile gases, phenols and hydrogen sulphide.</p>	<p>Government Agencies: The Shire of Swan indicated that proposed emission monitoring did not adequately manage possible chemical release (i.e. acid gas).</p> <p>The DEP consider baseline monitoring, prior to remediation works, as proposed in the CER to be appropriate. Removal of the liquid component from the pit will enhance volatilization.</p> <p>HDWA indicated that chemical emission results need to be viewed with caution due to minimal sampling conducted and the use of</p>	<p>Considered to be a relevant factor requiring further EPA evaluation. (Evaluated under Air Emissions in Table 3)</p>

FACTOR	PROPOSAL COMPONENT WITH POSSIBLE IMPACT	GOVERNMENT AGENCY AND PUBLIC COMMENTS	IDENTIFICATION OF RELEVANT ENVIRONMENTAL FACTORS
		<p>laboratory rather than in-situ field based techniques for analysis. A sampling program monitoring for a wider range of analytes is recommended. An air-monitoring plan should be submitted for HDWA and EPA approval.</p> <p>Public: The Bellevue Action Group is of the opinion that emission monitoring and control is inadequate to protect the nearby residents. They have expressed the view that residents should be relocated during remediation.</p> <p>The MPL Group has indicated that the present definition of sulfur compounds is inconclusive and requires further study. It is the opinion of the MPL Group that the entire section regarding atmospheric standards requires revision.</p> <p>Dingle & Bird Environmental Pty Ltd have detailed that further assessment for gaseous emissions is required. The current monitoring program proposed by the Proponent requires further support to detail its effectiveness. The description of toxicology of the contaminants detected at the site requires further attention.</p> <p>The Clean Air Committee considers that methods for preventing emissions have not been adequately defined. This includes the issue of atmospheric dispersion and air modelling data. The Clean Air Committee supports the relocation of nearby residents during the clean-up phase of the proposal.</p> <p>Further public submissions regarding chemical emissions raised the following issues:</p> <ul style="list-style-type: none"> • Air quality monitoring. • Auditing of results. • Emissions from waste. • Sampling methodologies. • Human health effects. 	
Waste Pit and Soil Remediation	The OMEX site has been identified as containing acidic waste oils and sludges derived from an oil re-refining process. From previous	<p>Government Agencies: The Shire of Swan indicated that the extent of remediation at the OMEX site was insufficient and concluded that the Adelaide Street Landfill should also be cleaned up.</p>	Considered to be a relevant factor requiring further EPA evaluation.

FACTOR	PROPOSAL COMPONENT WITH POSSIBLE IMPACT	GOVERNMENT AGENCY AND PUBLIC COMMENTS	IDENTIFICATION OF RELEVANT ENVIRONMENTAL FACTORS
	<p>investigations the Proponent has identified the location of both surface and subsurface soil and waste pit contamination at the OMEX site.</p> <p>The remedial works defined by the Proponent have been proposed to address these issues.</p>	<p>The DEP are of the opinion that the Adelaide Street Landfill should also be remediated by the Proponent.</p> <p>The DEP required analytical validation so the site can be appropriately classified. Visual inspection will not suffice.</p> <p>HDWA required validation of the bottom of the pit, which should include geotechnical evaluation, visual inspection and confirmatory analytical testing. All matters, which may affect the health and well-being of the public, require HDWA approval.</p> <p>The WRC have indicated that it is essential to remove all wastes from the pit.</p> <p>Public: The Bellevue Action group was concerned that:</p> <ul style="list-style-type: none"> • the CER provided insufficient information regarding the characteristics and health implications of contaminants; • the method of treatment and disposal are ineffective; and • the risk assessment was insufficient. <p>MPL Group have indicated that neutralization of the wastes, as proposed by the Proponent, may be ineffective due to chemical properties of the acidic wastes. Further testing into the effectiveness of treatment is recommended. The MPL Group also identified the corrosive nature of waste materials as an important factor in assessing remediation and management.</p> <p>Further public submissions regarding waste pit and soil remediation raised the following issues: Accuracy of previous investigations.</p> <ul style="list-style-type: none"> • The clean up of incidental off-site contamination. • Remediation depth of 3.5m. • Material handling. • Validity of the health risk assessment. • Excavation effectiveness. 	

FACTOR	PROPOSAL COMPONENT WITH POSSIBLE IMPACT	GOVERNMENT AGENCY AND PUBLIC COMMENTS	IDENTIFICATION OF RELEVANT ENVIRONMENTAL FACTORS
Noise and Vibration	The operation of plant and machinery during the remediation process will generate noise and vibration.	<p>Government Agencies: The DEP requires reports for noise monitoring on a regular basis.</p> <p>Public: The Bellevue Action Group indicated that during construction of the containment wall noise and vibration were at times unbearable.</p>	Considered to be a relevant factor requiring further EPA evaluation.

SOCIAL SURROUNDINGS

Transport	<p>The transport of materials to and from the OMEX site has the ability to impact upon vehicles, pedestrians and other road users. Those areas included within the specified haul routes will experience increased heavy vehicular movements. The transport of both treated and untreated waste materials from the OMEX site has the potential to impact upon the both the local and wider environments surrounding the proposed transport route. This risk also extends to the issue of human exposure in the event of accidental material release.</p>	<p>Government Agencies</p> <p>The MRD indicated its opposition to the transport route as defined within the CER and has developed a preferred transport route. The Midland Police concurred with the MRD. The Shire of Swan concurred with the MRD in regards to route selection and is of the opinion that further measures for the protection of local school children and other road users within the vicinity of the OMEX site be considered.</p> <p>Public</p> <p>The Bellevue Action Group expressed concern that transport and handling of the waste would result in widespread contamination of the environment surrounding the proposed routes.</p> <p>The Clean Air Committee noted that previous remediation attempts have experienced transport management problems due to the characteristics of the waste materials and the information presented within the CER does not stipulate adequate management arrangements.</p> <p>The Bellevue Primary School highlighted concerns regarding disruption of children during school hours.</p> <p>Further public submissions regarding transport road safety raised the following issues:</p> <ul style="list-style-type: none"> • Route selection. • Vehicle inspection & load testing. • Road user safety. • Traffic flow volumes. • Proposed risk reduction methods. 	Considered to be a relevant factor requiring further EPA evaluation.
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FACTOR	PROPOSAL COMPONENT WITH POSSIBLE IMPACT	GOVERNMENT AGENCY AND PUBLIC COMMENTS	IDENTIFICATION OF RELEVANT ENVIRONMENTAL FACTORS
Community Consultation	<p>The Proponent states that open lines of communication will be maintained between the Proponent, community and relevant government authorities.</p> <p>It is recognized that the public perception of remediating contaminated sites presents a mixture of real and perceived concerns.</p>	<p>Government Agencies: The Shire of Swan expressed concern regarding the adequate management of social impacts and indicated that a public communication strategy should be adopted.</p> <p>The DEP supported the release of regular community material/newsletters to keep the public properly informed of on-site activities.</p> <p>Public: The Bellevue Action Group is concerned about the communication management strategy to be adopted by the Proponent and based on past experiences (construction of the containment wall) has little to no trust that new remediation works will be undertaken any differently.</p> <p>The Bellevue Returned Services Community & Sporting Club Inc has highlighted several concerns regarding being informed as to the impacts operations may have to the operation of the club and facilities.</p> <p>Further public submissions regarding community consultation raised the following issues:</p> <ul style="list-style-type: none"> • Community education. • Emergency response. 	<p>Considered to be a relevant factor requiring further EPA evaluation.</p>
Health and Safety	<p>The OMEX CER and supporting documentation have highlighted the possible risk of contaminant exposure to workers at the site and the neighbouring public should contaminants exceed particular concentrations.</p> <p>As with any operational work site a range of physical health and safety issues will also be encountered.</p>	<p>Government Agencies: HDWA indicated that details regarding exposure pathways and health risk assessments have not been fully addressed within the CER. Further investigation is recommended. All matters affecting the health and well-being of the public should have HDWA approval.</p> <p>The DEP indicated as a requirement of the proposal that the Proponent prepare relevant plans for the management of: dust, odour, chemical gasses and transport.</p> <p>Public: Public submissions regarding health and safety raised the following issues:</p> <ul style="list-style-type: none"> • Contingency planning. • Response systems. 	<p>Considered to be a relevant factor requiring further EPA evaluation. (Evaluated under Air Emissions in Table 3.)</p>

FACTOR	PROPOSAL COMPONENT WITH POSSIBLE IMPACT	GOVERNMENT AGENCY AND PUBLIC COMMENTS	IDENTIFICATION OF RELEVANT ENVIRONMENTAL FACTORS
Security	The issue of security management at the OMEX waste site has been recognized by the CER.	<p>Government Agencies: The DEP have expressed concerns regarding the restriction of access to the OMEX site.</p> <p>Public: Public submissions regarding security raised the following issues:</p> <ul style="list-style-type: none"> • Excluding trespassers. • Protecting 'inquisitive' children. 	<p>As detailed within the CER and responses to submissions the Proponent will:</p> <ul style="list-style-type: none"> • Secure the site to provide reasonable access restriction; and • Employ security patrols during non-operational hours. <p>This factor does not require further EPA evaluation.</p>
GENERAL ISSUES			
Future Land Use	Land use for the site is planned to be suitable for residential occupation.	<p>Public: Submissions flagged the need to identify the OMEX land as being contaminated on title deeds and recommended that the land not be considered suitable for future residential development.</p>	Considered to be a relevant factor requiring further EPA evaluation.
Fate of Wastes	Removal and disposal of contaminated solid and liquid wastes from the OMEX site.	<p>Public: Submissions flagged the requirement for ensuring that contaminated wastes are disposed of in an acceptable manner.</p>	Considered to be a relevant factor requiring further EPA evaluation.

Legend:

WRC: Waters and Rivers Commission
DEP: Department of Environmental Protection
HDWA: Health Department of WA
EPA: Environmental Protection Authority
PAH: Polycyclic Aromatic Hydrocarbons

- Air Emissions (incorporating odour, dust and particulates, chemical emissions and health and safety);
- Waste Pit and Soil Remediation; and
- Noise and Vibration.

Social Surroundings

- Transport; and
- Community Consultation.

Other Issues

- Future Land Use; and
- Fate of Wastes.

The factors referred to above were identified from the EPA's consideration and review of all environmental factors (Table 2) generated from the CER document and the submissions received, in conjunction with:

- the proposal characteristics (including significance of potential impacts);
- the adequacy of the Proponent's response and commitments; and
- the effectiveness of current management and alternative approval processes which will ensure that the factors will be properly managed.

On the basis of this, the EPA considers that other environmental issues identified in the submissions do not require further evaluation in this Report. The identification process is summarised in Table 2. Submissions are summarised in the following section, but are discussed in more detail in Table 2.

Approach to Assessment

Details of the relevant environmental factors and their assessment is contained within Sections 3.1 to 3.9 of this Report. The assessment of each factor is where the EPA decides whether or not the proposal can meet the environmental objectives set for that factor. The assessment process:

- describes each factor and highlights primary issues of concern;
- reviews submissions on the CER regarding each factor;
- assesses proposed management and mitigation against the EPA's environmental objectives for each factor; and
- provides a summary of the outcomes of the assessment, which details whether or not the proposal can be successfully managed.

A summary of the assessment of the environmental factors relevant to the proposal is presented in Appendix 4, Table 3. The EPA decided that a number of the issues related to Social Surroundings would be discussed in some detail within this Report because of their importance to the community surrounding the site.

3.1 Waste Pit and Soil Remediation

Description

The OMEX site has been identified as containing acidic waste oils and sludges derived from an oil re-refining process performed on-site. From previous investigations the Proponent has identified the location of both surface and subsurface soil and waste pit contamination at the OMEX site. The remedial works defined by the Proponent (Figure 3) have been proposed to address these issues.

Numerous historical site investigations have been performed at the OMEX site and surrounding areas. Contaminated materials are present within the Major Pit, Minor Pit No. 1 and the surrounding site soils. The extent of impact identified is presented in Figure 4.

Within the Major Pit, the waste material consists of both solid and liquid fractions. Approximately 17000m³ of solid material (solid waste, rubble, soil trim and sand cover) and 4400m³ of liquid waste (with 1300 m³ estimated as recoverable) are reported to be present on site. The Major Pit material consists of:

- Acidic sludge and fill material with a low pH (around 2), containing elevated levels of heavy fraction hydrocarbons including PAHs and heavy metals, in particular lead;

- Viscous heavy fraction oil containing petroleum compounds, PAHs, phenols, and some minor levels of heavy metals, in particular lead; and
- Acidic groundwater with a pH of 1, containing elevated levels of heavy fraction hydrocarbons, PAHs, phenols and heavy metals, in particular cadmium, chromium, lead, molybdenum and zinc.

The volume of waste oil and cover material in Minor Pit No. 1 is estimated to be 500m³. While the waste materials are not reported to contain free liquids/oil and rubble-type material, visual observations suggested that the materials resemble those within the Major Pit.

According to the information provided within the CER, and further refined in the Egis Consulting report "Soil Contamination Status of the OMEX Site" (July 1999), the total volume of contaminated soil requiring removal is estimated to be 11295m³ over an approximate area of 4810m².

The soil contamination is identified as consisting of three distinct types and sources including:

- mildly acidic petroleum hydrocarbons with elevated levels of heavy metals and sulphate from waste created from the refinery process;
- heavier fraction hydrocarbons associated with oil storage; and
- sulphates arising from gypsum waste from the former plaster factory.

Approximately 1000m³ of oil sludge wastes were disposed of at the Adelaide Street Landfill facility in 1989. The exact location of the wastes has not been determined but has been approximated. The landfill operator is reportedly in the process of removing other materials above the OMEX wastes for recovery and recycling. Once the OMEX wastes are encountered, characterisation and remediation of the wastes will be performed. This is further discussed in Section 5 – Other Advice.

The proposal outlines the remediation program to be performed at the OMEX site, including dewatering of the pit, excavating the waste material and soils and backfilling of the excavation. The dewatering is proposed to lower the liquid level to below the floor of the Major Pit (approximately 10 mbgs). The liquid is anticipated to be a mixture of oil and contaminated groundwater. The liquid will be treated on-site to adjust the pH for transport to the Forrestdale Liquid Wastewater Treatment Facility.

The Proponent anticipates that upon removal of the liquids, the waste materials within the pit will be "spadeable", and that the waste material can be excavated from the Major Pit, treated on-site as required and transported off-site for disposal. The off-site disposal facility selected will be based on the results of the characterisation of the waste materials. The excavation of the surrounding soil and Minor Pit No. 1 is not anticipated to require dewatering.

Although not originally proposed for the entire excavation area, the Proponent has committed to performing soil validation sampling across each of the excavated areas to assist the evaluation of remedial measures and to document the quality of the soil that remains in-situ at the conclusion of excavation activities.

Upon receipt and review of the validation sample results, the excavations will be backfilled with clean fill from the base to within 3m of ground level with a 3m cover of compacted clay placed over the backfill. The top 3m of the containment barrier will also be removed and replaced with compacted clay to facilitate future development.

Note:

Prior to proceeding with the proposal, the Proponent will be implementing Dioxin testing on the soils. The EPA may recommend changes in actions in relation to the implementation of Stages 1 and 2 to the Minister for the Environment following consideration of the Dioxin testing results requested by the EPA.

Submissions

In general, government agencies indicated that the remediation program should include the Adelaide Street Landfill; that all waste materials be removed from the pit; that appropriate agencies (such as the HDWA) be contacted where appropriate to confer regarding matters which affect the health and well-being of the public; and that analytical validation, along with visual and geotechnical assessment of the in-situ soil be performed at the conclusion of excavation activities.

The comments received from the Public indicated concern about the remediation methodology proposed and the adequacy of the information available regarding the nature of the wastes. Also, concern was expressed regarding the accuracy of the risk assessment performed by the Proponent, the clean-up of incidental off-site contamination and the accuracy of the previous investigations.

Assessment

The EPA's objective is to ensure remediation of the OMEX site to a standard that is compatible with the intended residential land use. The area considered for assessment of this factor is the waste pit and the contaminated soils surrounding the pit. The Adelaide Street Landfill is also included within this assessment and is further discussed in Section 5.0.

In making the assessment, the EPA notes that the OMEX site is contaminated with acidic heavy fraction hydrocarbons, elevated heavy metals and sulphates and that these wastes are considered to be hazardous to human health. Furthermore, the OMEX site is located within a mixed residential and commercial area.

The method of treatment and disposal to landfill was generated by the Proponent in consultation with other divisions of the DEP, Geological Survey of WA, Golder Associates and Egis Consulting. However, the EPA considers that more information on the specific characteristics of the waste and its proposed treatment is required. The effectiveness of the excavation and treatment methods as proposed in the CER must be proven in field trials. This information is to be gathered by the Proponent during the Trial Excavation Program (Stage 1).

The DEP Contaminated Sites Branch typically requires the comparison of soil data from contaminated sites with the Australian and New Zealand Guidelines for the Assessment of Contaminated Sites (ANZECC/NHMRC, 1992) or in their absence, the Dutch Guidelines for Soil Remediation (1983). Both of these guidelines identify criteria applicable to sites based on future site usage or zoning for a number of contaminants. In general, the criteria utilised for residential properties are identified as ANZECC B and Dutch B criteria. These criteria identify the presence of contamination and indicate whether further assessment should be performed. In many instances, these criteria are used as response levels or remediation goals. Response levels or remediation goals are those criteria which are either published or derived on a site-specific basis, which designate the criteria to which remediation validation samples should be compared. They are often derived based on site-specific and receptor information.

The Proponent however has proposed the usage of response levels that include Health-Based Soil Investigation Levels. The Health-Based Soil Investigation Levels are those derived by the National Environmental Health Forum (NEHF). They are designated as NEHF(A) criteria and are based on a human exposure setting equivalent to a "standard residential setting with garden/accessible soil". These NEHF(A) criteria are also designated as acceptable for children's day care centres, kindergartens, pre-schools and primary schools. The NEHF (A) are considered appropriate for remediation to a residential use level and are used extensively elsewhere within Australia including, NSW, Qld, VIC and the ACT and are included within the Draft National Environmental Protection Measure for the Assessment of Site Contamination.

Based on the fact that:

- these NEHF(A) criteria are derived for intended residential land use;
- the contaminated soils are to be removed to at least 7 m in the Major Pit and 3.5 m in the surrounding area;

- clean backfill is to be placed in the excavations; and
- contaminants which remain *in situ* at the limits of excavation at concentrations greater than NEHF(A) criteria will be further addressed via a health risk assessment;

the usage of the NEHF(A) criteria are considered acceptable for this proposal by the EPA.

Where OMEX waste materials are considered to enter neighbouring properties (i.e. lots 130 and 136) the remediation works should be extended to include these areas and validation sampling is required to be undertaken within all excavated areas.

The OMEX related wastes at the Adelaide Street Landfill will also require remediation by the Proponent.

Proponent Commitments:

- The Proponent will undertake trial excavation and treatment tests prior to remedial works to confirm the nature of air emissions, review risks to human health and assess the performance of the proposed remediation approach.
- The Proponent will assess the nature and extent of OMEX waste contamination at the Adelaide Street Landfill facility.
- The Proponent will prepare a validation program (including sample validation) to demonstrate compliance with the NEHF (A) clean-up criteria.
- The Proponent will submit documentation on completion of the validation program providing evidence that clean up has been in accordance with EPA requirements.
- The Proponent will ensure contaminated land is remediated to the NEHF (A) criteria and contaminants which remain in-situ at the limits of the excavation at concentrations greater than NEHF(A) criteria will be further assessed via a health risk assessment.

Summary

Having particular regard to:

- the proposal defined by the CER and summarised in this Report;
- the net environmental benefits of the remediation program (removal of contaminants and construction of the containment wall);
- the Proponent's Commitments;
- the requirement to develop and undertake trial excavation planning and treatment program (Stage 1) prior to full scale remedial work being carried out (Stage 2);
- results of previous investigations performed on-site;
- human health risks presented by the ongoing presence of the OMEX waste; and
- remediation to the NEHF (A) criteria,

It is the EPA's judgement that the proposal can be managed to meet the EPA's environmental and health objectives, provided that the Proponent's Commitments and Recommended Environmental Conditions are made legally enforceable.

3.2 Air Emissions (incorporating odour, dust and particulates, chemical emissions and health & safety)

Description

It is expected that implementation of the Proposal will result in the generation of a variety of air emissions, including:

- odours;
- dust & particulates; and
- chemical emissions.

Although waste materials at the OMEX site are largely semi-volatile in nature, hydrocarbons still exhibit a natural odour-generation potential. Decomposition of these products over time may also lead to the generation of more volatile organic vapours, some of which would be regarded as highly odorous.

Laboratory analysis has also identified elevated concentrations of sulphur within the waste materials, however, an accurate definition of the form of sulphur has not been undertaken. Considering the reducing conditions presented by the acidic and anoxic environment of the waste pits, it is feasible that hydrogen sulphide could be present, thereby making odour generation a significant aspect of impact management.

As is common to most development, demolition and construction sites, dust will likely become an issue that will require attention by the Proponent. Apart from the direct human health and nuisance impacts of dust, the OMEX site presents the added risk of dust being potentially contaminated with a wide range of chemicals including heavy metals, Dioxins, PAHs, volatile organics, etc. Dust will be generated via the movement of soils and waste pit materials, treatment processes, loading and unloading of transport vehicles and storage of both treated and untreated contaminated materials.

The OMEX waste materials contain chemicals and gases, which will be released via excavations and subsequent treatment processes during remedial works. These gases have the potential to cause nuisance and may represent a health risk if in sufficient concentrations.

The Proponent has identified a range of chemicals within the solid and liquid wastes at the OMEX site, these are summarised, in part, as Tables 11 and 12 of the CER. A more detailed report regarding the soil contamination status of the OMEX site has also been prepared (Egis Consulting, July 1999). The contaminants identified include heavy metals (lead, zinc, copper, chromium, nickel, etc.), hydrocarbons (semi-volatile, volatile, PAHs and phenols) and sulphur. As expected, higher concentration of contamination exist within the oily sludges and liquid wastes of the Major Pit.

The Health Risk Assessment undertaken by the Proponent as part of the CER indicated that at the present time it was difficult to predict the exposure that receptors might receive during remediation. It is also stated that the studies related to air quality which have been performed at the site since 1994 have varying relevance to the manner of release anticipated during the proposed remediation project (CER, Appendix B – Table 1).

The CER and supporting documentation have highlighted the possible exposure risk to workers at the site and the neighbouring public, should contaminants exceed particular concentrations. As with any operational work site a range of physical health and safety issues will also be encountered.

The Proponent has identified measures that will be employed to minimise the risk of air emissions, including:

- pumping and transfer of Major Pit liquids will be performed in a closed piping system and using underground sumps;
- the sumps, pump pipework and other intrusions will be recovered/resealed;

- emissions from storage containers will be through carbon filters;
- during excavation, the HDPE cover will be removed in a manner that limits the release of emissions to acceptable levels and it will be removed in sections;
- on completion of work, the pit will be covered so that odour emissions are kept to a minimum; and
- regular air monitoring will be performed and the results will be compared against alert and action levels.

The Proponent has also indicated that air monitoring locations will be present in the work area as well as along the site boundary in a downwind direction and at the primary school. In addition, the trial excavation program and the Dioxin testing program will further assess potential issues associated with air emissions.

The Proponent will limit dust generation through:

- the use of water trucks to keep operational areas, access tracks, roads and stockpiles dry;
- keeping inactive stockpiles covered and placing wind fencing around the site boundary and along the periphery of the excavation;
- monitoring of dust emissions and reporting of the results; and
- preventing dust from leaving the site via trucks, cars and equipment through operation of a vehicle wash down area.

Submissions

In general, government agencies considered that odour generation was a key factor requiring further consideration by the Proponent. They also indicated that the proposed emission monitoring did not account for possibly unidentified chemical releases (i.e. acid gas) and that air emission monitoring programs should be developed and implemented. It was acknowledged that odours are likely to be emitted from the site and that public perceptions require careful management (i.e. safe levels are not necessarily indicated by lack of odour, and nuisance levels of odour do not necessarily indicate an unsafe level). On the basis of literature review and known site history, the HDWA have identified the issue of Dioxins as being of minimal risk to human health.

The Public indicated concern regarding the dust levels generated during the installation of the containment wall and were of the opinion that air emissions were inadequately addressed and little specific site information is available to support the appropriate management of air emissions. Overall concerns also included issues related to stockpile management, dust suppression, auditing of results, and sampling methodologies.

Assessment

The area considered for assessment of this factor is the proposal area and surrounding properties. The EPA's environmental objective for this factor is to ensure that air emissions during implementation of the project comply with the nominated alert and action levels presented in the CER (and those developed through the trial excavation program) for the protection of human health, welfare and amenity of surrounding land users.

The EPA recognises that the Proponent has not adequately detailed the characteristics or magnitude of air emissions likely to be generated at the OMEX site. However, it is also noted that in an effort to address these shortcomings the Proponent approached the EPA for approval to undertake a trial excavation and treatment program to obtain suitable field data from which likely air emissions could be estimated. As a result of the data obtained from these studies suitable management approaches would be developed.

The EPA understands the need to undertake further investigation by way of a well-defined trial excavation and treatment program prior to implementation of the full-scale remediation.

The Proponent has committed to prepare a trial excavation plan (Stage 1) for approval by the EPA prior to remedial works (Stage 2) being undertaken. Testing will include the collation of site-specific data regarding air emissions experienced during the trials. In addition, the Proponent will be performing Dioxin testing of the soils. The results will be used to develop appropriate management plans for the effective control of air emission issues.

The issue of dust management is a well-documented and commonly managed problem with much experience being derived from the construction industry. As the Proponent has indicated, the application of several dust suppression strategies can be utilised at the OMEX site depending upon the particular circumstances.

The EPA notes that the Proponent will be monitoring for particulate contamination and the results will be reported to the EPA on a regular basis. Although lead and PAH have been included for particulate monitoring, it is anticipated that data from the trial remediation and excavation program will clarify the analytes requiring management during full-scale remediation.

The EPA notes that the Proponent has highlighted a range of management approaches available to mitigate chemical emissions and has committed to ensuring that an appropriate monitoring program and occupational health and safety plan is developed prior to remediation works commencing. The Proponent has also committed to preparing an emergency response plan which will include a detailed emergency response to potential site events, including site evacuation. The Proponent has also committed to maintaining air quality monitoring on a 24 hour basis.

Summary

Having particular regard to:

- the environmental benefits of removing the wastes from a primarily residential area, in terms of reducing potential human exposure and environmental impacts ;
- the management measures as detailed by the Proponent;
- the proposed emergency response plan to be prepared by the Proponent and the availability of emergency response personnel operated by the state government;
- the commitments made to monitor air quality on a 24 hour basis,
- the requirements of the Land Development Sites Impacts on Air Quality Guidelines for Fugitive Dust Emissions, 1996; Interim Policy No. 18, Air Quality Impacts from Development Sites, July 1997;
- the fact that contaminants and fine particulate matter contained within the dust will be assessed against the proposed alert and action levels outlined in the CER ;
- the dust suppression methods outlined by the Proponent; and
- the Dioxin testing being performed by the Proponent and the EPA's requirement for trial excavation and treatment program,

it is the EPA's judgement that the proposal can be managed to meet the EPA's environmental and health objectives for air emissions, provided that the Proponent's commitments are made legally enforceable.

Important:

A staged approach to the implementation of the proposal has been recommended by the EPA, as set out in Section 2 of this Report. The trial excavation stage (Stage 1) has been designed to collect required site-specific data regarding the site's waste materials and the likely effects of

undertaking remedial works at the OMEX site. Should this new information indicate potentially unacceptable levels of risk to human health or the environment then progress to Stage 2 (Implementation of Remedial Works) would not be approved unless the Proponent can demonstrate that the risks can be reduced to acceptable levels.

3.3 Groundwater

Description

Contamination from the OMEX oil re-refining operations has impacted groundwater within the Upper Leederville Formation (ULF). The groundwater down gradient of the Major Pit within the ULF has been impacted by increases in total dissolved solids (TDS), sulphate, phenols, hydrocarbons and heavy metals. Current data have identified a sulphate contaminated groundwater plume extending approximately 150m southwest of the major pit. A plume of elevated heavy metals and hydrocarbons has been estimated to extend up to 100m from the major pit with increasing concentrations nearer the OMEX site.

Contaminated groundwater has been isolated by the containment wall around the Major Pit, although it is proposed that much of the liquid waste within the Major Pit will be removed during implementation of the proposal. Groundwater in the vicinity of the OMEX site is not being used and has not been identified as posing a threat to any known uses such as ecosystem support. The WRC has reviewed the proposal and advised the Proponent that the Major Pit is the only significant source of contamination to the Leederville Aquifer.

Submissions

Government agencies including the WRC and the HDWA indicated support for the proposal but stipulated that measures including, but not limited to, on-going monitoring, and prohibition of groundwater usage within the plume area should be performed.

The Public concluded that long-term management of the groundwater was required via sampling and groundwater use restrictions. There was also concern regarding the integrity of the containment wall.

Assessment

The areas considered for assessment of this factor are those groundwater resources directly beneath the proposal area and down hydraulic gradient of the OMEX site which are impacted by the contaminant plume. The EPA's environmental objective for this factor is to monitor the quality of groundwater both beneath and down hydraulic gradient of the OMEX site in order to ensure impacts upon human health and the environment are acceptable.

As detailed within the CER contamination is restricted within the ULF, and groundwater modelling undertaken by the Proponent has indicated contaminant migration will tend towards the southwest. While the installation of the bentonite containment wall has isolated the source of contamination from the surrounding aquifer systems, the contaminant plume exists outside the containment wall as a result of historical impacts. Groundwater modelling provided in the CER predicted that within 50 years the leading edge of the plume will extend approximately 800 m to the southwest. Degradation of the plume is expected to restrict any further migration.

Although remediation of the groundwater beneath the OMEX site is not proposed, the Proponent has outlined the following management strategies/plans to minimise potential impacts:

- In locations where there is groundwater contamination above levels considered suitable for irrigation purposes the use of groundwater resources in the immediate area will be restricted until monitoring indicates otherwise.
- Caveats placed on groundwater usage will be applied or removed in response to groundwater quality changes.

- As defined through current investigations, the only user identified as potentially at risk from the migration of the plume is the Goodchild Oval bore, down hydraulic gradient of the OMEX site.

The EPA notes that the remediation works as proposed by the Proponent will provide a net positive effect to the site's contaminated groundwater from removal of contaminant sources. Installation of the bentonite containment wall has also arrested the continuing contamination of groundwater beneath the OMEX site. These actions represent two very positive effects of the remediation processes and will aid in the long-term reduction of impact within the surrounding aquifer systems.

Even though the long-term management of groundwater did not form part of the Proponent's proposal the EPA believes that, in order to meet community expectations concerning the groundwater contamination issue, commitments must be made and plans provided which indicate who is responsible for on-going management.

In response to this direction the Proponent has committed to negotiating with relevant government agencies to develop an agreed long-term approach to groundwater management both on-site and down hydraulic gradient of the OMEX site.

Summary

Having particular regard to:

- the net environmental benefits of the remediation program (removal of contaminants and construction of the containment wall);
- the current regulatory systems for groundwater use, monitoring and management; and
- the Proponent's commitment to developing management arrangements with relevant government agencies;

it is the EPA's judgement that the proposal can be managed to meet the EPA's environmental objective for groundwater management, provided that the Proponent's commitments are made legally enforceable.

3.4 Surface Water

Description

The OMEX site has a relatively flat topography with no significant natural drainage systems or on-site collection areas. All surface flows from the site are largely controlled via the neighbouring road/stormwater drainage systems.

Activities involved with the remediation of the waste pit materials (liquid and solids) and surrounding contaminated soils have the capacity to act as sources for the secondary contamination of surface water. The treatment and subsequent storage of contaminated materials is likely to produce surface water pollution in the form of concentrated leachate or run-off during rain events. The majority of the site will be directly exposed to natural rainfall events. Without adequate measures being taken by the Proponent the natural and man-made drainage systems surrounding the OMEX site are at risk of receiving contaminated surface water flows.

As presented within the CER the Proponent has proposed measures to manage surface water run-off, run-on and infiltration. These included the following:

- Remediation at the OMEX site will be managed so as to prevent or minimise stormwater entering exposed contaminated wastes.
- Leachate generated from waste stockpile and operational areas (mixing trommel etc.) will be contained on-site and disposed of in a manner dependant upon the level of contamination.

- Run-off to the excavations will be directed to sumps for appropriate disposal.
- Stockpiled areas will be located on a hardstand area or compacted limestone base. This area will be drained to the pit or to a purpose built sump.
- Inactive stockpiles will be kept covered.

Once remediation has been completed and the final landform determined, drainage will be designed so as to shed waters away from the site. This requirement will also be incorporated within future site development activities.

Submissions

Government agencies noted that provisions to bund stockpile areas and collect run-off should be made during site activities and that adequate provisions should be in-place to ensure long-term surface water collection.

General public submissions regarding surface water management raised issues of leachate management (treatment and stockpiling), surface water segregation/contaminated waters retained on-site, surface water monitoring, and surface drainage post remediation.

Assessment

The area considered for assessment of this factor is the proposal area and includes nearby roads, drains and associated receiving environments (both natural and man-made). The EPA's environmental objective for this factor is to ensure that contaminated surface water run-off does not leave the OMEX site.

The Proponent has committed to ensuring that all surface water drainage will be retained on-site and disposed of in accordance with applicable requirements. The EPA notes that a wide variety of suitable surface water management systems and techniques are readily available within Western Australia.

Summary

Having particular regard to:

- the relatively unrestricted availability of suitable surface water management techniques, monitoring systems, and technology;
- the surface water management strategies presented within the CER; and
- the Proponent's commitment to retaining all surface waters on-site;

it is the EPA's judgement that the proposal can be managed to meet the EPA's environmental objective for surface water, provided that the Proponent's commitments are made legally enforceable.

3.5 Noise and Vibration

Description

The operation of plant and equipment during the remediation process will generate noise and vibration. The generation of the noise and vibration will be limited to the hours of operation and expected duration of the project (i.e. expected to be less than six months). Potential noise impacts associated with an increase in vehicle movements is addressed under Transportation (Section 3.6).

To manage noise and vibration, the Proponent has committed to:

- preparing an Environmental Management Plan which incorporates the management of noise and vibration;
- complying with Environmental Protection (Noise) Regulations 1997;
- complying with the Australian Standard for vibration so as not to affect residents or surrounding property;
- undertaking noise and vibration monitoring to demonstrate compliance;
- undertaking management actions if values are exceeded; and
- facilitating communication between residents and the Proponent regarding the performance of remedial work.

Submissions

The DEP as advisors to the EPA, indicated that they require reports for noise monitoring on a regular basis. The Public indicated that construction of the containment wall created unbearable noise and vibration and that the Bellevue Primary School expressed concern regarding operations disturbing children during school hours.

Assessment

The area considered for the assessment includes those in and around the OMEX site, particularly residents and the Bellevue Primary School. The EPA's environmental objective is to ensure that noise and vibration generated on-site meet the requirements of the Environmental Protection (Noise) Regulations and appropriate Australian Standards for vibration.

The EPA recognises the concerns of the community in regards to the noise and vibration that will be generated during implementation of the proposal, but also considers that given proper management, they can be mitigated.

Summary

Having particular regard to:

- the environmental benefits of the remediation program;
- the management directions as detailed by the proponent;
- the monitoring to be performed by the Proponent; and
- the agreement by the Proponent to provide ongoing communication to the residents regarding the performance of the remedial works;

it is the EPA's judgement that the proposal can be managed to meet the EPA's environmental objective for noise and vibration, provided that the Proponent's commitments are made legally enforceable.

3.6 Transport

Description

The transport of materials to and from the OMEX site has the potential ability to impact upon vehicles, pedestrians and other road users. Those areas included within the specified haul routes will experience increased heavy vehicular movements.

The transport of both treated and untreated waste materials from the OMEX site has the potential to impact upon both the local and wider environments surrounding the proposed transport route. This risk also extends to the issue of human exposure in the event of accident.

The Proponent has committed to:

- preparing a Transport Management Plan in liaison with the MRD for the safe and effective transport of materials to and from the OMEX site;
- transporting all materials in appropriately equipped and labelled trucks; and
- preparing a Waste Management Plan to ensure contaminated materials are managed and disposed of in a manner, which reduces environmental impact and risk to human health.

As detailed within the CER and responses to submissions the Proponent will also:

- monitor transport operators;
- ensure transport vehicles are roadworthy;
- ensure a waste transport register is maintained;
- audit loads to ensure compliance; and
- develop a preferred route in consultation with the MRD and Bellevue Primary School.

All transport vehicle movements will be controlled under the Traffic Act and enforced by Main Roads and the WA Police.

Liquid wastes will be transported under the Environmental Protection Act (1996) Liquid Waste Regulations.

Submissions

Main Roads, the Shire of Swan and the Midland Police indicated their opposition to the transport route as defined within the CER and Main Roads has developed a preferred transport route.

Both government and public agencies expressed concern regarding the protection of local school children in the vicinity of the OMEX site. The Public also was concerned regarding transport management of contaminated materials.

Assessment

The area included within the assessment covers the locality of the site as well as the transport routes, people, pedestrians and other road users. The EPA's environmental objective for this factor is to ensure the safe transport of the OMEX waste materials to the intended disposal facilities and to minimise impacts to the surrounding residences, Bellevue Primary School and the public.

The EPA recognises that the movement of contaminated materials on and off the OMEX site presents a series of concerns related to potential exposure of materials through mishandling or accidental release. However, given appropriate planning and management, as identified within the Proponent's commitments, the EPA considers the risk associated with transport to be manageable.

Summary

Having particular regard to:

- the environmental benefits of removing the wastes from a primarily residential based area in terms of reducing potential human exposure and environmental impacts;

- the management directions as detailed and committed to by the Proponent; and
- the coordination of transport with appropriate agencies and stakeholders;

it is the EPA's judgement that the proposal can be managed to meet the EPA's environmental objective for safe transport, provided that the Proponent's commitments are made legally enforceable.

3.7 Community Consultation

Description

The Proponent states that open lines of communication will be maintained between the Proponent, community and relevant government authorities. It is recognized that the public perception of remediating contaminated sites presents a mixture of real and perceived concerns.

To address the requirements of Community Consultation, the Proponent has committed to:

- managing the community consultation and communication process by regular newsletters, information sessions and direct liaison with residents adjacent to the OMEX site; and
- preparing an operational health and safety plan to ensure that remedial works are undertaken in a safe manner with no risk to site personnel or the public. This plan is to include emergency response/contingency planning.

Submissions

Government agencies supported the need for release of community information and the development of a public communication strategy. The Public was concerned about proposed communication strategies given their previous experiences during the construction of the containment wall and about potential impacts on the operation of the local community and sporting club.

Assessment

The surrounding community as well as the wider Perth community are considered to be affected by the proposal. The EPA's objective is to ensure that open communications are developed and maintained by both the Proponent and the community to allow for acceptable implementation of the proposal.

The EPA recognises that the community feels that information provided by the proponent in the past regarding site activities has been insufficient and that an open-dialogue between the Proponent and the community has not been fostered. The EPA considers that measures have been initiated to increase the level of public information and communication through the CER process. The Proponent recognises their responsibility to provide detailed information to the community and to address their concerns.

Summary

The EPA recognises Community Consultation as being extremely important. The Proponent has provided commitments regarding Community Consultation and the EPA will liaise with the Proponent and the community to ensure that these measures are undertaken in a satisfactory manner.

3.8 Future Land Use

The Western Australian Government has committed to remove the contents of the Major Pit and remediate the site to a standard suitable for residential development. An underground containment wall currently surrounds the pit to provide long-term isolation of the contaminated

material from the adjacent soil and groundwater. The Proponent will remove contaminated materials within the area of the containment wall as well as the designated surrounding soils.

The EPA recognises that residual contaminated soils may remain on-site subsequent to site remediation. The Proponent has indicated that any remaining OMEX wastes left in-situ will only be those which are shown not to pose a risk through a human health risk assessment. The extent of contaminated materials that may remain on-site will be documented through analytical validation sampling. As such, restrictions will be placed on groundwater usage (Section 3.3) and a memorial can be placed on the title, if deemed necessary.

The Proponent has committed to:

- ensuring that the contaminated land is remediated to the NEHF (A) criteria or to goals determined by a health risk assessment; and
- prepare and implement a soil validation program to the requirements of the EPA.

Additional information regarding future land use is discussed in Section 5.0.

3.9 Fate of Wastes

The solid and liquid wastes removed from the OMEX site are to be disposed of off-site at appropriately licensed facilities. The material may require pre-treatment in order to meet the requirements of the disposal facilities. In addition, characterisation of the wastes will be performed to enable selection of the appropriate off-site disposal facility.

The EPA considers that removal of the materials off-site for disposal meets the original requirement set out by the Western Australian Government of removal of the contents of the Major Pit and remediation of the site to a standard suitable for residential development. However, the EPA recognises that the materials removed from the OMEX site should not be disposed of in a manner that could create potential future issues at the selected off-site disposal facility.

The Proponent has committed to:

- preparing a waste management plan which identifies methods of disposal for solid and liquid waste materials prior to remedial works; and
- disposing of all contaminated soil and liquid wastes in accordance with the Waste Classification and Waste Definitions.

In addition, disposal of wastes will be to appropriately designed and licensed facilities. As such, pre-treatment of the wastes may be required prior to their movement off-site.

Based on the proposal and the Proponent's commitments, it is the EPA's judgement that the disposal of the wastes will not put the environment or human health at risk.

4. Conditions and Commitments

Section 44 of the *Environmental Protection Act (1986)* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

In developing recommended conditions for each project, the EPA's preferred course of action is to have the Proponent provide an array of commitments to ameliorate the impacts of the proposal on the environment. The commitments are considered by the EPA as part of its assessment of the proposal, and following discussion with the Proponent the EPA may seek additional commitments.

The EPA recognises that not all of the commitments are written in a form which makes them readily enforceable, but they do provide a clear statement of the action to be taken as part of the

Proponent's responsibility for, and commitment to, continuous improvement in environmental performance. The commitments, modified if necessary to ensure they are enforceable, then form part of the conditions to which the proposal should be subject if it is to be implemented.

The EPA may, of course, also recommend conditions additional to those relating to the Proponent's commitments.

4.1 Proponent's commitments

The Proponent's commitments, as shown in Appendix 5 (Schedule 2), should be made enforceable conditions.

4.2 Recommended conditions

Having considered the Proponent's commitments and the information provided in this report, the EPA has developed a set of conditions, which the EPA recommends be imposed if the proposal by the Waste Management Division of the Department of Environmental Protection to remediate the OMEX site, is approved for implementation.

During the assessment process, the EPA decided that a two stage approach for the remediation would be appropriate. Stage 1 would include the trial excavation program to characterise the wastes and Stage 2 would include undertaking the full scale remediation program. This allows the EPA to review the outcomes of the trial excavation prior to the Proponent proceeding with full remediation, and allows the recommendation of changes in actions in relation to the implementation of Stages 1 and 2 to the Minister for the Environment following consideration of the results of the Dioxin testing requested by the EPA. Implementation of Stage 2 will not take place until the requirements of Stage 1 have been adequately fulfilled.

Matters addressed within as recommended environmental conditions include the following:

Stage 1 - Implementation of Trial Excavation Plan

- Prior to the commencement of full-scale remedial works, the Proponent shall prepare a Trial Excavation Plan to the requirements of the Environmental Protection Authority.

This plan shall address:

1. the collation of site specific data regarding air emissions (both gaseous and particulate) anticipated during the excavation, handling and treatment of the contaminated waste materials;
 2. broad screening of suspected analytes to confirm the nature of air emissions;
 3. monitoring for and control of malodorous and nuisance vapours;
 4. monitoring parameters;
 5. risk to human health and the environment; and
 6. excavation activities which are likely to increase air emissions.
- The Proponent shall report in detail on the findings of the Trial Excavation Plan required by Condition 1-1, including any proposed changes to the implementation of Stage 2 which may be required, to the requirements of the Environmental Protection Authority.

Note: The Environmental Protection Authority may recommend changes and actions in relation to the implementation of Stage 2 to the Minister for the Environment following consideration of the report on the findings of the Trial Excavation Plan.

Stage 2 - Implementation Environmental Management Plan

- Prior to the commencement of full-scale remedial works, the Proponent shall finalise its development of a comprehensive Environmental Management Plan, drawing upon the

findings of the Trial Excavation Program, to the requirements of the Environmental Protection Authority on advice of Health Department of WA and the Water and Rivers Commission.

This plan shall address:

1. air emissions (particulate and gaseous);
2. noise and vibration;
3. surface water;
4. remediation processes (from initial characterisation to final disposal);
5. community consultation; and
6. health and safety (including emergency and contingency planning).

Post-Remediation Management Plan

- Prior to validation of the remediated site by the EPA, the Proponent shall prepare a Post-Remediation Management Plan to the requirements of the Environmental Protection Authority.

This Plan shall address:

1. final landscaping;
2. geotechnical evaluation of stability of the site;
3. long-term management of the site to protect the integrity of remedial works; and
4. document the remediation process and remaining sub-surface condition via validation results.

Proponent Commitments

- The Proponent shall implement the consolidated environmental management commitments as documented within Schedule 2 of this statement.

5. Other Advice

The proposal represents a positive effort in returning otherwise contaminated and sterile land to a fit and proper state. The issues of redevelopment and an approach to the long term monitoring and management of the OMEX site are not within the scope of this assessment and require further consideration and discussion among the appropriate regulatory authorities, agencies, stakeholders and the public.

In particular, issues related to long-term groundwater management should be further considered. The EPA believes that in order to meet community expectations concerning the groundwater contamination issue, commitments must be made and plans provided which indicate who is responsible for on-going management. In response to this direction the Proponent has committed to negotiating with relevant government agencies to develop an agreed long-term approach to groundwater management both on-site and down hydraulic gradient of the OMEX site. These negotiations would need to include the placing of caveats on land titles in relation to groundwater usage, depending upon changes in groundwater quality.

In the past, a portion of the contaminated materials at the OMEX site were transported to the nearby Adelaide Street Landfill for disposal. Approximately 1000m³ of oil sludge was disposed of at the Adelaide Street Landfill. It is believed to be disposed of at two locations within the landfill and is now covered with an estimated 6m of landfill cover. Remediation of these materials is proposed at a later date.

The EPA recognises that remediation of the OMEX waste materials present at the Adelaide Street Landfill is not currently feasible as the materials are not accessible at this moment in time.

However, the EPA understands that these materials are anticipated to be accessible within the next two years (per the CER).

The Proponent has committed to address the Omex-related contamination at a later date, once the materials are accessible to removal.

6. Conclusions

The EPA has considered the proposal by the Proponent to remediate the OMEX site. The EPA notes that the proposal presents a positive effort in returning otherwise contaminated and sterile land to a fit and proper state for residential use. Although several restrictions have been identified within this Report, they can be overcome by appropriate preparation and planning (as outlined in the staged implementation program) and by attention to detailed management systems.

The EPA has concluded that the remediation proposal can be managed in an environmentally acceptable manner and will result in an environmental benefit.

7. Recommendations

Recommendations

The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister notes that the project being assessed is for the rehabilitation and remediation of land contaminated by the improper storage/disposal of waste oil from an oil re-refining operation. This site is located within a mixed residential and commercial use area and represents an on-going risk to the health and well-being of the surrounding community and environment. After remediation the land will be redeveloped in accordance with the Western Australian Planning Commission Improvement Plan No. 30 and be suitable for residential purposes.
2. That the Minister considers the report on the relevant environmental factors as set out in Section 3 of this Report.
3. That the Minister notes that the EPA has concluded that the remediation proposal will result in environmental benefit and can be managed to meet the EPA's environmental objectives, provided that the Proponent's Commitments and the Proposed Environmental Conditions are implemented.
4. That the Minister imposes the conditions and procedures recommended in Appendix 5 of this report.

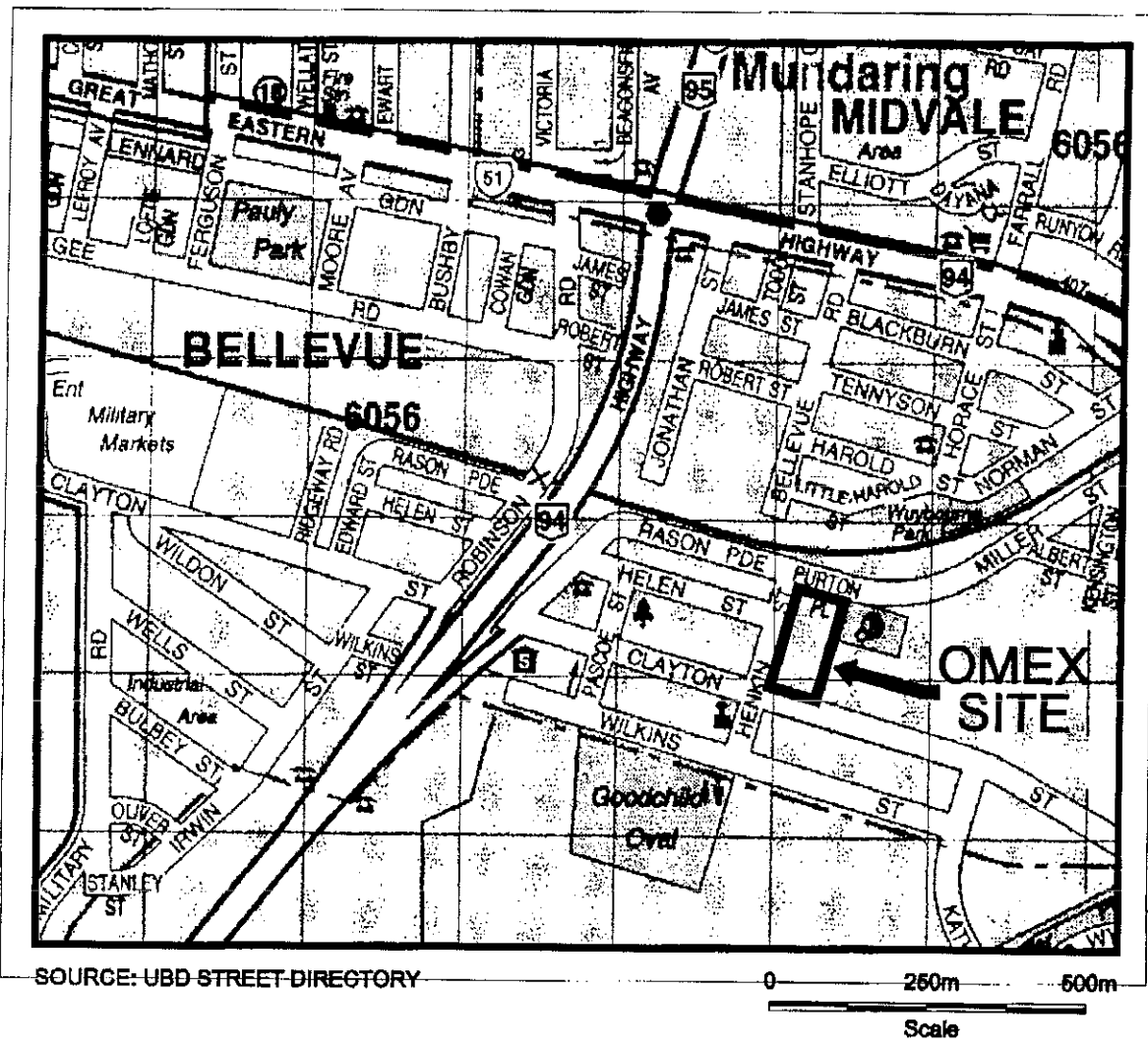
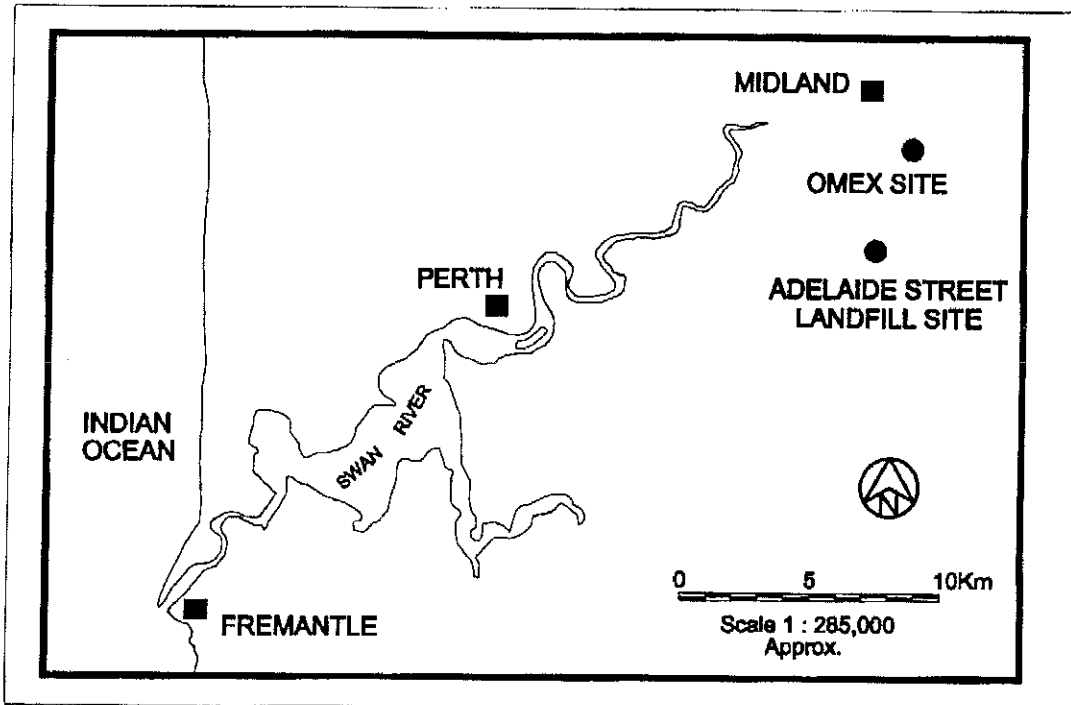


Figure 1. Site location (Source: Egis Consulting Australia).

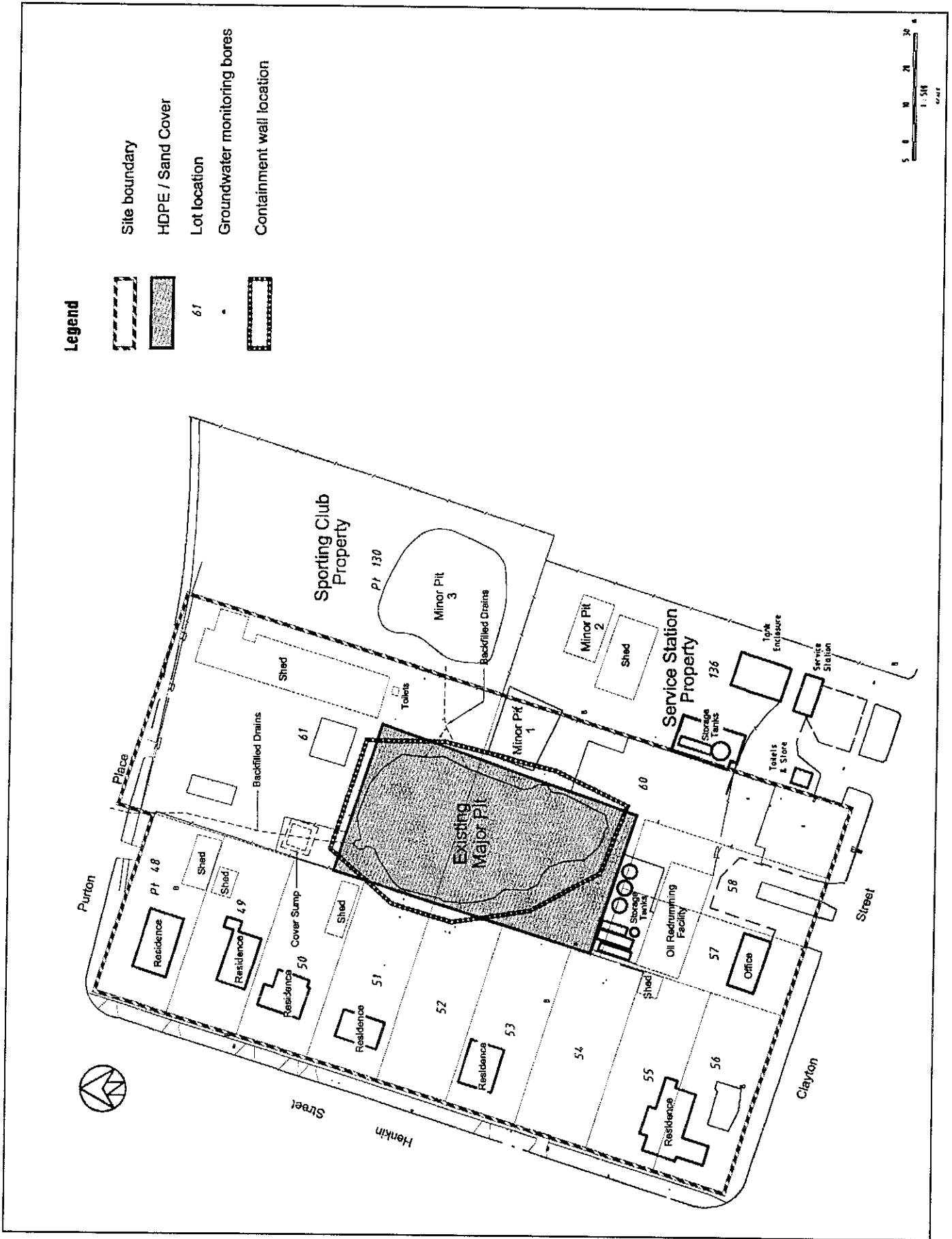


Figure 2. Site layout (Source: Egis Consulting Australia).

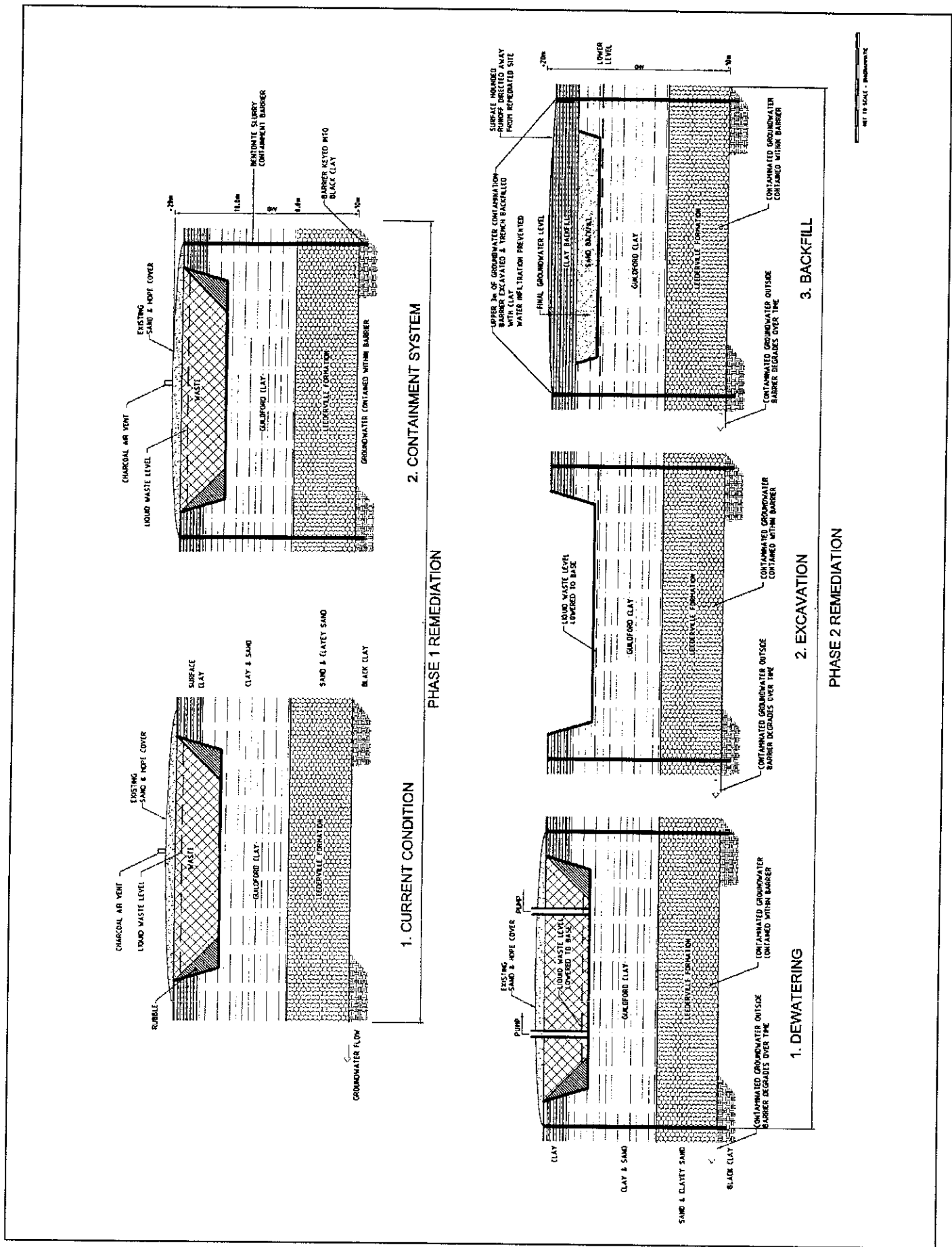


Figure 3. Proposed Remediation Area (Source: Egis Consulting Australia).

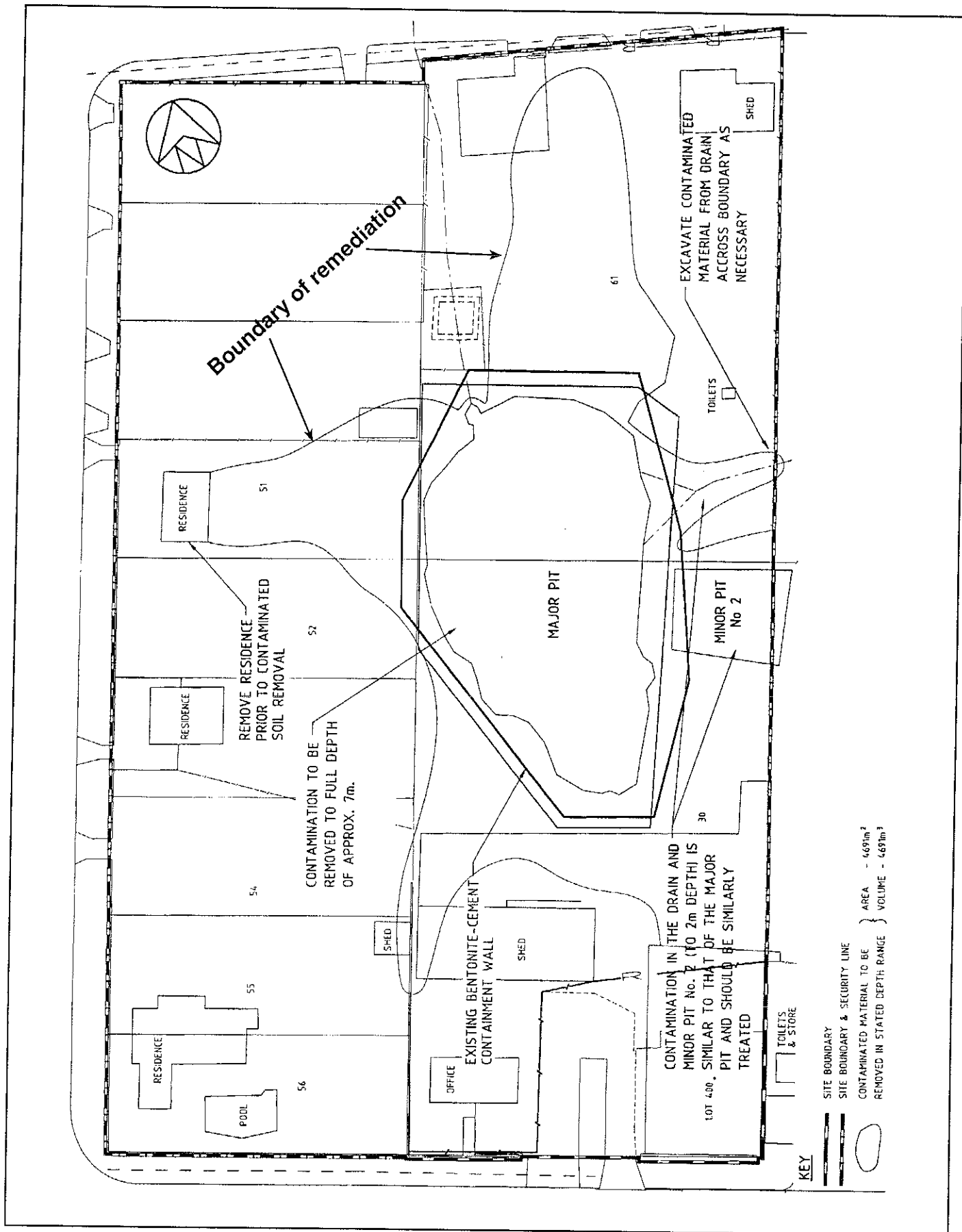


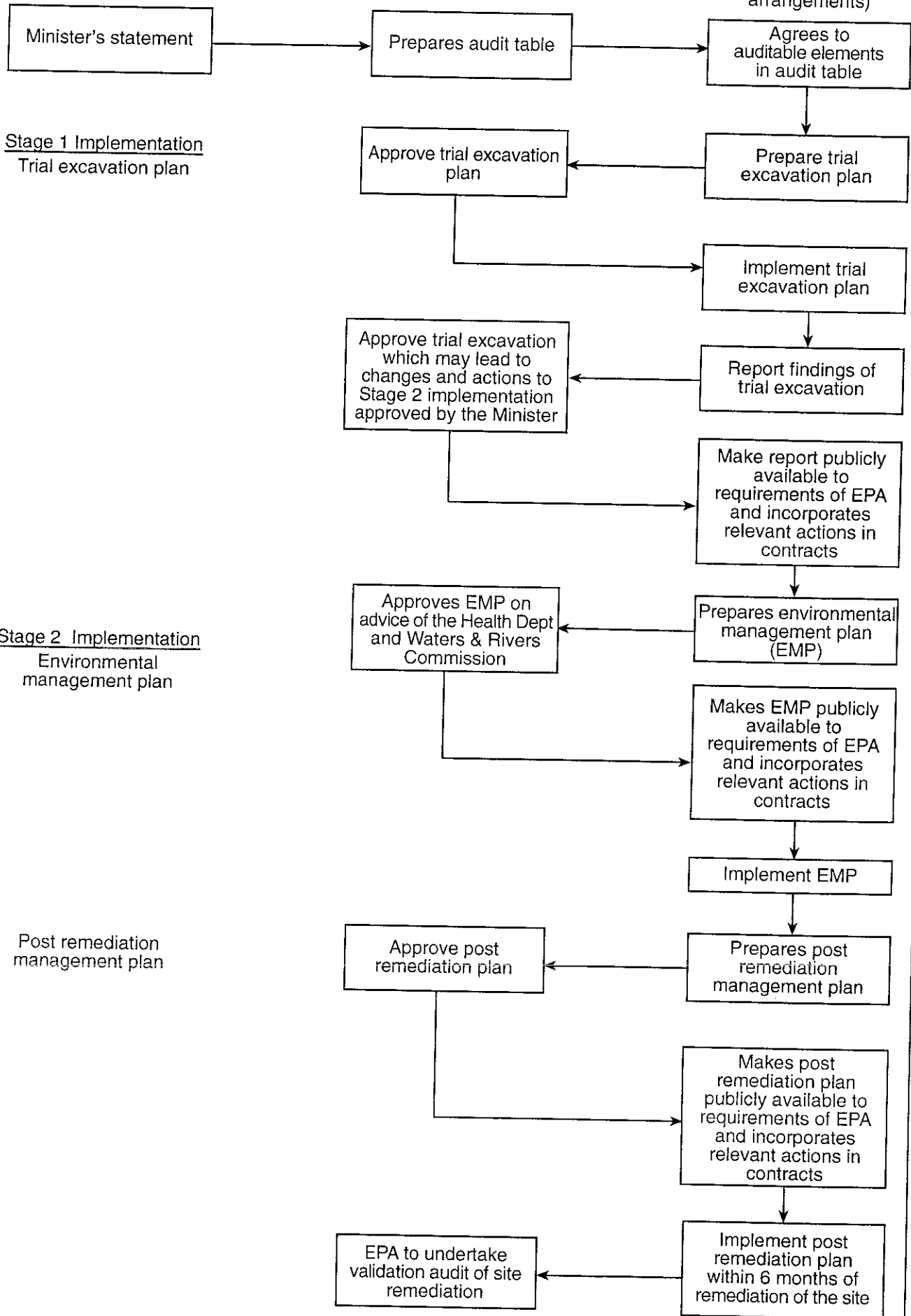
Figure 4. Proposed Remediation Area (Source: Egis Consulting Australia).

Appendix 1
Project Flow Diagrams

REMEDIAL ACTION FLOW DIAGRAM

EPA

Proponent (including contractual arrangements)



ORGANISATIONAL RESPONSIBILITIES

MINISTER

CEO

EPA

Waste Management
Division
Proponent

Assessment
Advisors

Evaluation Division
Assessment
Administration

Pollution Prevention
Division - contaminated
sites advice

Egis consulting
project
managers

Earthworks
engineering
contractor
remedial works

Other
government
agencies
Health, WRC -
specialist advice

EPA
consultants -
independent
advisors

Assessment

Audit

SIGN OFF DIAGRAM

1

EPA Bulletin

- Proponent commitments

— CEO sign-off

- EPA draft conditions

— EPA consultant draft
Evaluation Division review format
EPA chairman sign-off

2

Appeal Process Advice

- Minister requests EPA advice

— EPA consultant draft
Evaluation Division review format
EPA chairman sign-off

3

Minister sets conditions

— EPA consultant prepares audit table
Evaluation Division reviews format
EPA Chairman signs off

4

Monitoring of conditions

— EPA auditor conducts audit
EPA chairman advises Minister
of compliance or recommended
changes or actions

Appendix 2
List of Submitters

Public

Rosina Milanovic

Avon Clean and Green

Clean Air Committee

Bellevue Returned Services Community and Sporting Club Inc.

Bellevue Action Group

Omex Site Remediation Implementation – Consultative Committee

Bellevue Primary School P & C Association

MPL Group Ltd

Dingle and Bird Environmental

Woodward-Clyde Pty. Ltd.

Government

Midland District Police Office

Shire of Swan

Main Roads Western Australia

Health department of Western Australia

Waters and Rivers Commission

Department of Environmental Protection (Contaminated Sites Branch)

Appendix 3

References

- DEP (1996a) *Landfill Waste Classification and Waste Definition*. Department of Environmental Protection, Government of Western Australia, September, 1996.
- EPA (1993) *Draft Western Australian Water Quality Guidelines for Fresh and Marine Waters*. Environmental Protection Authority Bulletin 711, October 1993.
- EPA (1993). *Southern Landfill Project, South Cardup*. Environmental Protection Authority Bulletin 702, September 1993.
- EPA (1997). *Rehabilitation of Former Industrial Land, McCabe Street, Mosman Park – proposal for management of additional waste volumes – proposed change to environmental conditions*. Environmental Protection Authority Bulletin 863, July 1997.
- EPA (1997). *Class IV Waste Disposal Cells, Red Hill Waste Disposal Facility, Toodyay Road, Red Hill, Shire of Swan*. Environmental Protection Authority Bulletin 867, October 1997.
- EPA (1998). *Remediation and Redevelopment of the Swan Portland Cement Site, Burswood*. Environmental Protection Authority Bulletin 879, January 1998.
- EPA (1997). *Liquid Waste Treatment Plant – Lot 197 Cocos Drive, Bibra Lake*. Environmental Protection Authority Bulletin 402, December 1997.
- EPA (1999). *Regional Resource Recovery Centre, Pt Lot 78 and Pt Lot 85 Bannister Road, Canning Vale*. Environmental Protection Authority Bulletin 938, June 1999.
- EPA (1997). *Remediation of the Former Liquid Waste Disposal Facility, Southern River Road, Gosnells*. Environmental Protection Authority Bulletin 876, December 1997.
- NM&MRC (1989). *Australian Guidelines for the Rehabilitation of Contaminated Land*. National Health and Medical Research Council. Draft, 1989.

Appendix 4

Summary of Assessment of Relevant Factors

Table 3: Summary of Assessment of Relevant Environmental Factors

RELEVANT FACTOR	RELEVANT AREA	EPA ENVIRONMENTAL OBJECTIVES	EPA ASSESSMENT	EPA ADVICE
Waste Pit and Soil Remediation	<p>The proposal area, in particular the waste pit and surrounding contaminated soils.</p> <p>The Adelaide Street Landfill.</p>	<p>To ensure remediation of the OMEX site to a standard that is compatible with the intended land use.</p> <p>To ensure that the Proponent remediates the OMEX related waste at the Adelaide Street Landfill.</p>	<p>It is noted that:</p> <ul style="list-style-type: none"> The OMEX site is contaminated with acidic heavy fraction hydrocarbons, elevated heavy metals and sulfates. The OMEX wastes are considered to be hazardous to human health. The OMEX site is located within a mixed residential and commercial area. The method of treatment and disposal (treatment and disposal to landfill) generated by the Proponent in consultation with other divisions of the DEP, Geological Survey of WA, Golder Associates and Egis Consulting. It is considered that more information on the specific characteristics of the waste and its proposed treatment is required. The National Environmental Health Forum-Health Investigation Levels (NEHF (A)) are considered appropriate for remediation to a residential use level. Contaminants which remain <i>in situ</i> at the limits of the excavation at concentrations greater than NEHF(A) criteria will be further assessed via a health risk assessment. The NEHF (A) guidelines are used extensively elsewhere within Australia including, NSW, Qld, VIC and the ACT. The effectiveness of the excavation and treatment methods as proposed within the CER must be proven in field trials. Where OMEX waste materials are considered to enter into neighboring properties (i.e. lots 130 and 136), the remediation works will be extended to include these areas. Validation sampling is required to be undertaken within all excavated areas. The OMEX related wastes at the Adelaide Street Landfill require remediation by the Proponent. <p>Proponent's Commitments:</p>	<p>Having particular regard to:</p> <ul style="list-style-type: none"> The proposal defined by the CER and summarised in this report; The net environmental benefits of the remediation program (removal of contaminants and construction of the containment wall); Proponent's commitments; Requirements to develop and undertake trial excavation and treatment programs (Stage 1) prior to full scale remedial works (Stage 2); Results of previous investigations performed on-site; Human health risks presented by the presence of the OMEX waste; and Remediation to the NEHF (A) criteria; <p>it is the EPA's judgement that the proposal can be managed to meet the EPA's environmental and health objectives.</p>

RELEVANT FACTOR	RELEVANT AREA	EPA ENVIRONMENTAL OBJECTIVES	EPA ASSESSMENT	EPA ADVICE
			<ul style="list-style-type: none"> The Proponent will assess the nature and extent of OMEX waste contamination at the Adelaide Street Landfill facility. The Proponent will prepare a validation program (including sample validation) to demonstrate compliance with the NEHF (A) clean-up criteria. The Proponent will submit documentation on completion of the validation program providing evidence that clean up has been in accordance with EPA requirements. The Proponent will undertake trial excavation and treatment tests prior to remedial works to confirm the nature of air emissions, review risks to human health and assess the performance of the proposed remediation approach. The Proponent will ensure contaminated land is remediated to the NEHF (A) criteria and contaminants which remain <i>in situ</i> at the limits of the excavation at concentrations greater than NEHF(A) criteria will be further assessed via a health risk assessment.. 	
Air Emissions (incorporating, odour, dust & particulates and chemical emissions and Health & Safety from Table 2).	The proposal area and surrounding properties.	To ensure air emissions during implementation of the project comply with criteria set down for the protection of human health, welfare and amenity of surrounding land users and site workers.	<p>It is noted that:</p> <ul style="list-style-type: none"> Chemical emissions will be generated during remediation works at the site. This may include malodorous and nuisance vapours (odours). The Proponent has not adequately detailed the risk posed by these chemicals. The EPA will require regular reporting of air emission results. The issue of expected odour generation will require the effective management of community consultation and communication processes. Trial excavations and treatment tests should be undertaken prior to remedial works commencing. Detailed screening for a broad range of analytes should be undertaken during these trials to define appropriate monitoring requirements. Dust will be generated during the excavation, treatment, storage and removal of contaminated materials from the OMEX site. 	Having particular regard to: <ul style="list-style-type: none"> The net environmental benefit of removing the wastes from a primarily residential area, in terms of reducing potential human exposure and environmental impacts; The management measures as detailed by the Proponent; The proposed emergency response plan to be prepared by the Proponent and the availability of emergency response personnel; The commitment to monitor air quality on a 24-hour basis; The requirement to utilise applicable guidelines and criteria; The dust suppression methods outlined by the Proponent; and The recommended ministerial conditions incorporating <u>Dioxin testing, trial</u>

RELEVANT FACTOR	RELEVANT AREA	EPA ENVIRONMENTAL OBJECTIVES	EPA ASSESSMENT	EPA ADVICE
			<ul style="list-style-type: none"> • Contaminants may be mobilized in particulate form via the generation and dispersion of dust. Dust may present an issue for welfare and visual amenity. • The EPA has informed the Proponent that testing for Dioxins and subsequent analysis and reporting will be required prior to approval of remedial works. The Proponent will perform this testing. • The results of trial excavations will be used to develop the environmental management plans, which will address, among other things the management of dust and particulate contamination and odours. • The issue of dust management is a well-documented and commonly managed problem. Dust suppression techniques are of relatively minimal cost and can be applied effectively in emergency situations. <p>Proponent's Commitments:</p> <ul style="list-style-type: none"> • The Proponent will undertake testing of waste material, site soil and off-site soil in accordance with the Dioxin testing program issued by the EPA in a letter dated 20/7/99. • The Proponent shall undertake further laboratory testing for air emissions from waste material. • The Proponent shall prepare a trial excavation program (methodology and objectives) for approval by the EPA prior to remedial works. Testing will include the collation of site specific data regarding air emissions (gaseous and particulates) experienced during excavation and treatment trials. • The Proponent shall prepare and implement an environmental management plan addressing all environmental factors at the OMEX site. • The Proponent shall prepare an operational health and safety plan prior to remedial works to ensure the safety of site personnel and the public. • Air emissions will be managed to comply with the 	<p>excavations and environmental management plans,</p> <p>it is the EPA's judgement that the proposal can be managed to meet the EPA's environmental and health objectives.</p>

RELEVANT FACTOR	RELEVANT AREA	EPA ENVIRONMENTAL OBJECTIVES	EPA ASSESSMENT	EPA ADVICE
Groundwater	The groundwater resources directly beneath the proposal area and down hydraulic gradient of the OMEX site.	To monitor the quality of groundwater both directly beneath and down hydraulic gradient of the OMEX site in order to identify and manage impacts upon human health and the environment.	<p>required guidelines (guidelines will require review upon results from trial excavation and testing).</p> <ul style="list-style-type: none"> The Proponent will also manage the issues of air quality (odour, dust, chemical etc.) via the community consultation and communication process so as to keep the public informed of remediation developments. <p>It is noted that:</p> <ul style="list-style-type: none"> The waters of the Guildford and Upper Leederville Formation (ULF) aquifers are contaminated up to approximately 100 m down hydraulic gradient of the OMEX site. Remediation works proposed by the Proponent will remove the majority of contaminant sources, which are currently polluting the groundwater systems. The bentonite containment wall has isolated (as far as is possible) the majority of contaminated materials from the surrounding aquifer systems. The WRC and HDWA support the view that groundwater remediation is not warranted given that waste materials will be removed, remaining secondary sources have been isolated and monitoring will continue into the future. The WRC has placed a ban on the construction of new extraction bores within the vicinity of the groundwaters affected by the OMEX site; the HDWA concurs with this action. Groundwater monitoring must be undertaken to determine the integrity of the bentonite containment wall. Responsibility for on-going monitoring and associated reporting and follow-up needs to be formally defined. <p>Proponent's commitments:</p> <ul style="list-style-type: none"> The Proponent will negotiate with relevant government agencies to develop an agreed long-term approach to groundwater management both on-site and down hydraulic gradient of the OMEX site. The outcome will ensure that future groundwater quality managed to protect human health and the environment to the requirements of the EPA 	<p>Having particular regard to:</p> <ul style="list-style-type: none"> The proposal defined by the CER; The environmental benefits of the remediation program; The current regulatory systems for groundwater use, monitoring and management arrangements; and Proponents' commitment to developing management arrangements with relevant government agencies, <p>it is the EPA's judgement that the proposal can be managed to meet the EPA's environmental objectives.</p>

RELEVANT FACTOR	RELEVANT AREA	EPA ENVIRONMENTAL OBJECTIVES	EPA ASSESSMENT	EPA ADVICE
Surface Water	The proposal area including nearby roads, drains and associated receiving watercourses (both natural and man-made).	To ensure that the mobilization and transport of contaminants from the OMEX site within surface waters from the site do not compromise human health or the environment.	<p>It is noted that:</p> <ul style="list-style-type: none"> • No significant natural surface drainage features are present at the OMEX site. • Contaminated run-off is likely to be produced during excavation, treatment and stockpiling of the waste materials. • Contaminated surface water will leave the site if left unabated. • Contaminated surface waters should be retained on-site for appropriate treatment and subsequent disposal. • Surface water management systems are readily available within Western Australia. • Post closure surface water and drainage management will be required following the completion of remedial works. <p>Proponent's commitments:</p> <ul style="list-style-type: none"> • The Proponent shall ensure that all surface water drainage will be retained on-site and disposed of appropriately. • All contaminated materials removed from the site will be disposed of in accordance with the Landfill Waste Classification and Waste Definitions. 	<p>Having particular regard to:</p> <ul style="list-style-type: none"> • The proposal defined by the CER; • The availability of suitable surface water management techniques monitoring systems and technology; • the surface water control strategies presented in the CER; and • the Proponent's commitments to retaining all surface waters on-site, <p>it is the EPA's judgement that the proposal can be managed to meet the EPA's environmental objectives.</p>

RELEVANT FACTOR	RELEVANT AREA	EPA ENVIRONMENTAL OBJECTIVES	EPA ASSESSMENT	EPA ADVICE
<p>Noise and Vibration</p>	<p>The operation of plant and equipment during the remediation process will generate noise and vibration. The generation of the noise and vibration will be limited to the hours of operation and expected duration of the project (i.e. expected to be less than six months)</p>	<p>To ensure the mitigation of any noise and vibration which occur on-site in accordance with Environmental Protection (Noise) Regulations and appropriate Australian Standards for vibration.</p>	<p>It is noted that:</p> <ul style="list-style-type: none"> • Noise and vibration during implementation of the proposal would effect workers and surrounding neighbors, particularly residents and the Bellevue Primary School; • The community is concerned about the noise and vibration that will be generated during implementation of the proposal; • Given proper management, the effects of noise and vibration during proposal implementation can be mitigated. <p>Proponent's Commitments:</p> <ul style="list-style-type: none"> • Preparing a Environmental Management Plan which incorporates the management of noise and vibration; • Comply with Environmental Protection (Noise) Regulations 1997; • Comply with the Australian Standard for vibration so as not to effect residents or surrounding property; • Undertake noise and vibration monitoring to demonstrate compliance; • Undertake management actions if values are exceeded; and • Facilitate communication between residents and the Proponent regarding the performance of remedial work. 	<p>Having particular regard to:</p> <ul style="list-style-type: none"> • The environmental benefits of the remediation program; • The management directions as detailed by the proponent; • The monitoring to be performed by the Proponent; and • The agreement by the Proponent to provide ongoing communication to the residents regarding the performance of the remedial works, <p>it is the EPA's judgement that the proposal can be managed to meet the EPA's environmental objectives.</p>

RELEVANT FACTOR	RELEVANT AREA	EPA ENVIRONMENTAL OBJECTIVES	EPA ASSESSMENT	EPA ADVICE
Transport	The area included within the assessment covers the locality of the site as well as the transport routes, people, pedestrians and other road users.	To ensure the safe transport of the OMEX waste materials to the intended disposal facilities.	<p>It is noted that:</p> <ul style="list-style-type: none"> The transport of materials to and from the OMEX site has the ability to impact upon vehicles, pedestrians and other road users. Those areas included within the specified haul routes will experience increased heavy vehicular movements. The movement of contaminated materials on and off the OMEX site presents a series of concerns related to potential exposure of materials through mishandling or accidental release. Appropriate planning and management would reduce potential risks associated with transport. <p>Proponent's commitments:</p> <ul style="list-style-type: none"> Preparing a Transport Management Plan in liaison with the MRD for the safe and effective transport of materials to and from the OMEX site; Transporting all materials in appropriately equipped and labeled trucks; Preparing a Waste Management Plan to ensure contaminated materials are managed and disposed of in a manner, which reduces environmental impact and risk to human health. As detailed within the CER and responses to submissions the Proponent will also; <ul style="list-style-type: none"> - Monitor transport operators; - Ensure transport vehicles are roadworthy; - Ensure a waste transport register is maintained; - Audit loads to ensure compliance; and - Develop a preferred route in consultation with the MRD and Bellevue Primary School. 	<p>Having particular regard to the:</p> <ul style="list-style-type: none"> The environmental benefits of removing the wastes from a primarily residential based area in terms of reducing potential human exposure and environmental impacts; The management directions as detailed and committed to by the Proponent; and The coordination of transport with appropriate agencies and stakeholders, <p>it is the EPA's judgement that the proposal can be managed to meet the EPA's environmental objectives.</p>
			<p>All transport vehicle movements will be controlled under the Traffic Act and enforced by the Main Roads and Police.</p> <ul style="list-style-type: none"> Liquid wastes will be transported under the Environmental Protection Act (1996) Liquid Waste Regulations. 	

RELEVANT FACTOR	RELEVANT AREA	EPA ENVIRONMENTAL OBJECTIVES	EPA ASSESSMENT	EPA ADVICE
Community Consultation	The surrounding community as well as the Perth community as a whole is considered to be affected by the proposal	To ensure that open communications are developed and maintained by both the Proponent and the community to allow for acceptable implementation of the proposal.	<p>It is noted that:</p> <ul style="list-style-type: none"> • The community feels that information provided by the proponent in the past regarding site activities has been felt to be insufficient and that an open-dialogue between the Proponent and the community has not been fostered. • Public perception of remediating contaminated sites presents a mixture of real and perceived concerns. • The measures have been initiated to increase the level of public information and communication through the CER process. • The Proponent recognises their responsibility to provide detailed information to the community and to address their concerns. <p>Proponent's commitments:</p> <ul style="list-style-type: none"> • The Proponent will manage the community consultation and communication process by regular newsletters, information sessions and direct liaison with residents adjacent to the OMEX site; and • The Proponent will prepare an operational health and safety plan ensuring that remedial works are undertaken in a safe manner with no risk to site personnel or the public. This plan is to include: emergency response/ contingency planning. 	<p>The EPA recognises the Community Consultation as being extremely important. The Proponent has provided commitments regarding Community Consultation and the EPA will liaise with the Proponent and the community to ensure that these measures are undertaken in a satisfactory manner.</p>

RELEVANT FACTOR	RELEVANT AREA	EPA ENVIRONMENTAL OBJECTIVES	EPA ASSESSMENT	EPA ADVICE
Future Land Use	The waste pit and the surrounding contaminated soils.	To ensure remediation of the OMEX site to a standard that is compatible with the intended residential land use.	<p>It is noted that:</p> <ul style="list-style-type: none"> The Western Australian Government has committed to remove the contents of the Major Pit and remediate the site to a standard suitable for residential development. An underground containment wall currently surrounds the pit to provide long-term isolation of the contaminated material from the adjacent soil and groundwater. The Proponent will remove contaminated materials within the area of the containment wall as well as the designated surrounding soils. However, some contaminated materials may remain on the OMEX site. It is considered that the adoption of NEHF (A) criteria would be suitable for the intended residential land use; Contaminants which remain <i>in situ</i> at the limits of the excavation at concentrations greater than NEHF(A) will be further assessed via a health risk assessment; The Proponent has indicated that remaining materials will not pose a risk to human health or the environment and that the extent of contaminated materials that may remain on-site will be documented through analytical validation sampling. Restrictions will be placed on groundwater usage (Section 3.3) and soil conditions. <p>Proponent's commitments:</p> <ul style="list-style-type: none"> The Proponent will ensure that the contaminated land is remediated to the NEHF (A) Health Investigation Level or to goals determined by health risk assessment; and The Proponent will prepare and implement a soil validation program to the requirements of the EPA. 	<p>The EPA recognises that residual contaminated soils may remain on-site subsequent to site remediation. The Proponent has indicated that any remaining OMEX wastes left in-situ will only be those which are shown not to pose a risk through a health risk assessment. The extent of contaminated materials that may remain on-site will be documented through analytical validation sampling. As such, restrictions will be placed on groundwater usage and a memorial can be placed on the title, if deemed necessary.</p>

RELEVANT FACTOR	RELEVANT AREA	EPA ENVIRONMENTAL OBJECTIVES	EPA ASSESSMENT	EPA ADVICE
Fate of Wastes	The waste materials to be removed from the OMEX site.	Remediation of the OMEX site without creating potential future issues at the selected disposal facility.	<p>It is noted that:</p> <ul style="list-style-type: none"> The solid and liquid wastes removed from the OMEX site are to be disposed of off-site at appropriately licensed facilities. The material may require pre-treatment in order to meet the requirements of the disposal facilities. The EPA considers that removal of the materials off-site for disposal meets the original requirement set out by the Western Australian Government of removal of the contents of the Major Pit and remediation of the site to a standard suitable for residential development. However, the EPA recognises that the materials removed from the OMEX site should not be disposed of in a manner that could create potential future issues at the disposal facility. <p>Proponent's commitments:</p> <ul style="list-style-type: none"> The off-site disposal facility will be selected based on the results of waste characterisation. The Proponent will prepare a waste management plan which identifies methods of disposal for solid and liquid waste materials prior to remedial works; The Proponent will dispose of all contaminated soil and liquid wastes in accordance with the Waste Classification and Waste Definitions. <p>In addition, disposal of wastes will be to appropriately designed and licensed facilities. As such, pretreatment of the wastes may be required prior to their movement off-site.</p>	Based on the proposal and the Proponent's commitments, it is the EPA's judgement that the disposal of the wastes will not put the environment or human health at risk.

Appendix 5

Recommended Environmental Conditions and Proponent's Consolidated Commitments

Recommended Environmental Conditions

Statement No.

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED (PURSUANT TO THE PROVISIONS OF THE ENVIRONMENTAL PROTECTION ACT 1986)

REMEDIATION OF THE OMEX CONTAMINATED SITE, BELLEVUE, (Shire of Swan).

Proposal: The proposal encompasses a trial excavation (Stage 1) followed by full remediation of the site via excavation, treatment (where applicable) and removal of contaminated acidic waste oil sludge and soil from waste pits and surrounding lands (Stage 2) at the OMEX contaminated site, Bellevue, as documented in Schedule 1 of this statement. Delineation of OMEX related wastes at the Adelaide Street Landfill, Hazelmere will also take place.

Proponent: The Department of Environmental Protection – Waste Management Division

Proponent Address: Level 8,
Westralia Square
141 St George's Terrace
PERTH WA 6000

Assessment Number: 1180

Report of the Environmental Protection Authority: Bulletin 951

The proposal to which the above report of the Environmental Protection Authority relates may be implemented in stages subject to the following conditions and procedures. Implementation of stage 2 will not take place until the requirements of stage 1 have been adequately fulfilled.

Note: The EPA may recommend changes in actions in relation to the implementation of Stages 1 and 2 to the Minister for the Environment following consideration of the results of the dioxin testing requested by the EPA.

Stage 1 Implementation

1 Trial Excavation Plan

- 1-1 Prior to the commencement of full-scale remedial works, the proponent shall prepare a Trial Excavation Plan to the requirements of the Environmental Protection Authority.

This plan shall address:

- 1 the collation of site-specific data regarding air emissions (both gaseous and particulate) anticipated during the excavation, handling and treatment of the contaminated waste materials;
 - 2 broad screening of suspected analytes to confirm the nature of air emissions;
 - 3 monitoring for malodorous and nuisance vapours;
 - 4 monitoring parameters;
 - 5 risk to human health and the environment; and
 - 6 excavation activities which are likely to increase air emissions.
- 1-2 The proponent shall make the plan required by condition 1-1 publicly available, to the requirements of the Environmental Protection Authority.
- 1-3 The proponent shall implement the Trial Excavation Plan required by condition 1-1 to the requirements of the Environmental Protection Authority.
- 1-4 The proponent shall report in detail on the findings of the Trial Excavation Plan required by condition 1-1, including any proposed changes to the implementation of Stage 2 which may be required, to the requirements of the Environmental Protection Authority.
- 1-5 The proponent shall make the report required by condition 1-4 publicly available, to the requirements of the Environmental Protection Authority .

Note: the Environmental Protection Authority may recommend changes and actions in relation to the implementation of Stage 2 to the Minister for the Environment following consideration of the report required by condition 1-4.

Stage 2 Implementation

2 Environmental Management Plan

- 2-1 Prior to the commencement of full-scale remedial works, the proponent shall develop a comprehensive Environmental Management Plan drawing upon the findings of the Trial Excavation Plan, to the requirements of the Environmental Protection Authority on advice of the Health Department of WA and the Water and Rivers Commission.

This plan shall address:

- 1 air emissions (particulate and gaseous);
Air emissions shall be monitored, assessed and actively managed so as to protect both human health and the environment. The trial excavation plan previously undertaken by the proponent will provide essential site-specific data on which to base the site's air emissions monitoring systems.
 - 2 noise and vibration;
Noise and vibration shall be monitored and managed so as to ensure impact on surrounding structures and the public (neighbouring residences and school) are minimised.
 - 3 surface water;
Surface water shall be managed so as to prevent impact on both human health and the environment. No surface water shall leave the OMEX site.
 - 4 remediation processes (from initial characterisation to final disposal);
The process of implementation and control to be employed by the proponent during remediation will be documented within the Environmental Management Plan.
 - 5 community consultation;
The community is to be kept informed of the progress of remediation at the OMEX site via regular communication and consultation. This process of information exchange will ensure that issues are addressed as they arise and that details regarding progress, timing, impacts and likely completion are effectively communicated between involved parties.
 - 6 health and safety (including emergency or contingency planning).
To protect workers, surrounding residents and the public from possible human health effects of the remediation operation, a health and safety management plan will be developed. The proponent will also prepare emergency /contingency plans to maintain public safety.
- 2-2 The proponent shall make the Environmental Management Plan required by condition 2-1 publicly available, to the requirements of the Environmental Protection Authority.
- 2-3 The proponent shall implement the Environmental Management Plan required by condition 2-1 to the requirements of the Environmental Protection Authority.

3 Post-Remediation Management Plan

- 3-1 Prior to validation of the remediated site by the Environmental Protection Authority, the proponent shall prepare a Post-Remediation Management Plan to the requirements of the Environmental Protection Authority.

This Plan shall address:

- 1 final landscaping;
 - 2 geotechnical evaluation of stability of the site;
 - 3 long-term management of the site to protect the integrity of remedial works; and
 - 4 documentation of the remediation process and remaining sub-surface condition via validation results.
- 3-2 The proponent shall make the Post-Remediation Management Plan required by condition 3-1 publicly available, to the requirements of the Environmental Protection Authority.
- 3-3 Within 6 months following the completion of the remediation of the site, the proponent shall implement the Post-Remediation Management Plan required by condition 3-1, to the requirements of the Environmental Protection Authority.

General Conditions and Procedures

4 Implementation

- 4-1 Subject to these conditions and procedures, the proponent shall implement the proposal as documented in schedule 1 of this statement.
- 4-2 Where the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment determines, on advice of the Environmental Protection Authority, is substantial, the proponent shall refer the matter to the Environmental Protection Authority.
- 4-3 Where the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment determines, on advice of the Environmental Protection Authority, is not substantial, those changes may be effected.

5 Proponent Commitments

- 5-1 The proponent shall implement the consolidated environmental management commitments documented in schedule 2 of this statement.
- 5-2 The proponent shall implement subsequent environmental management commitments which the proponent makes as part of the fulfilment of conditions and procedures in this statement, and those made following both the dioxin testing and the trial excavation (Stage 1).

6 Proponent

- 6-1 The proponent for the time being nominated by the Minister for the Environment under section 38(6) or (7) of the Environmental Protection Act 1986 is responsible for the implementation of the proposal until such time as the Minister for the Environment has exercised the Minister's power under section 38(7) of the Act to revoke the nomination of that proponent and nominate another proponent in respect of the proposal.
- 6-2 Any request for the exercise of that power of the Minister referred to in condition 6-1 shall be accompanied by a copy of this statement endorsed with an undertaking by the proposed replacement proponent to carry out the proposal in accordance with the conditions and procedures set out in the statement.
- 6-3 The proponent shall notify the Environmental Protection Authority of any change of proponent contact name and address within 30 days of such change.

7 Commencement

- 7-1 The proponent shall provide evidence to the Minister for the Environment within 18 months of the date of this statement that the proposal has been substantially commenced.
- 7-2 Where the proposal has not been substantially commenced within 18 months of the date of this statement, the approval to implement the proposal as granted in this statement shall lapse and be void. The Minister for the Environment will determine any question as to whether the proposal has been substantially commenced.
- 7-3 The proponent shall make application to the Minister for the Environment for any extension of approval for the substantial commencement of the proposal beyond 18 months from the date of this statement at least six months prior to the expiration of the 18 month period referred to in conditions 7-1 and 7-2.
- 7-4 Where the proponent demonstrates to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority that the environmental parameters of the proposal have not changed significantly, then the Minister may grant an extension not exceeding 12 months for the substantial commencement of the proposal.

8 Compliance Auditing

- 8-1 The proponent shall submit periodic Performance and Compliance Reports, in accordance with an audit program prepared in consultation between the proponent and the Environmental Protection Authority.
- 8-2 Unless otherwise specified, the Environmental Protection Authority is responsible for assessing compliance with the conditions, procedures and commitments contained in this statement and for issuing formal, written advice that the requirements have been met.
- 8-3 Where compliance with any condition, procedure or commitment is in dispute, the matter will be determined by the Minister for the Environment.

Note:

- 1 Validation as referred to in these conditions: Validation will be undertaken via visual inspection and confirmation analytical sampling. The appropriate Australian Standard is to be maintained during sampling. As stated within the EPA assessment the criteria applied to validation at the OMEX site is the NEHF (A) criteria for Residential Use or where developed via site-specific health risk assessment. Validation will ensure that the status of the material left in-situ at the OMEX site is adequately defined prior to backfilling or decommissioning of the remediation project.*

The Proposal

The OMEX site is located within the Perth suburb of Bellevue and includes the lands between Purton Place and Clayton Street (Figure 1). This area encompasses Lots, 48 to 58 and Lots 60 to 61 (Figure 2). Neighbouring residential and commercial properties are located adjacent to, or directly opposite, the OMEX site (Figure 2).

Of the six remediation options considered by the Proponent, landfill disposal, incorporating pre-treatment with an alkaline material (neutralising agent), was deemed the most appropriate (CER Section 5.0). This preferred approach to site remediation is to be undertaken within two separate phases, Phase I – Containment (completed) and Phase II - Remediation (Figure 3). A detailed explanation of the proposed remediation approach is also presented within Section 6.0 of the CER.

Phase I - Containment

The Containment Phase at the OMEX site has been completed and was implemented at the OMEX site under a public works order in an attempt to isolate the impacted groundwater and limit continuing impact upon the local aquifer systems beneath the site. A sub-surface barrier now surrounds the major waste pit and extends from the surface to the upper confining clay layer of the Lower Leederville Formation (LLF). This wall has effectively 'isolated' the waste materials in the Major Pit from the environment and has minimised ongoing groundwater impacts.

Phase II – Remediation

The implementation of Phase II will be carried out in two stages. Stage 1 will be the performance of a trial excavation program to obtain sufficient field data regarding the proposed remedial method. Information obtained from Stage 1 as well as from tests being undertaken for the presence of Dioxin will be used to identify/modify those procedures associated with implementation of the full-scale remedial program (Stage 2).

Prior to excavation for Stage 2 implementation, the major pit within the containment barrier will be de-watered. The liquid level (liquid wastes and contaminated groundwater) will be removed to a depth of approximately 10 m below the ground surface (mbgs). It is estimated that about 4400m³ of this liquid material will be treated on-site to adjust pH before being transported off-site to the Forrestdale Liquid Waste Treatment Facility.

Once excess liquids have been removed from the site and materials become spadeable the solid wastes will be excavated, treated (as required) and removed for off-site disposal. Continuous liquid waste sumps will operate within the pit to manage the seepage of liquids into the open excavations. The facility selected for off-site disposal will be determined based on the results of waste characterisation and on-site treatment.

After site validation the excavated pit(s) will be backfilled with clean materials up to a depth of 3 mbgs. This remaining void will be backfilled with compacted clay in order to allow future property development.

A summary of the key characteristics of the proposal is presented in Table 1. A detailed description of the proposal is provided in Section 6.0 of the CER (Waste Management Division-DEP, 1999).

**Proponent's Consolidated Environmental Management
Commitments**

10 September 1999

REHABILITATION OF THE OMEX
CONTAMINATED SITE, BELLEVUE,
SHIRE OF SWAN

DEPARTMENT OF ENVIRONMENTAL PROTECTION –
WASTE MANAGEMENT DIVISION

**ENVIRONMENTAL MANAGEMENT COMMITMENTS -
REMEDICATION OF OMEX CONTAMINATED SITE
ASSESSMENT NUMBER 1180**

Topic	Commitment	Action	Timing	Objectives	On advice from	To the satisfaction of
Environmental Sampling	1	Undertake testing of waste material, site soil and off-site soil in accordance with the dioxin testing program issued by the EPA dated 20/7/99.	Prior to remedial works.	To assess the pit waste and surrounding soil for the presence of dioxin. Review the risk to human health and the environment based on data gained from the testing program.	HDWA	EPA
Pre-remediation Air Monitoring Exercise	2	Undertake further laboratory testing of the air emissions generated from the waste material. Prepare a trial excavation program (methodology and objectives) for approval by the EPA. Perform a trial excavation into the major pit and monitor air emissions. Undertake treatment trials of the waste material and monitor air emissions. Collate site specific data regarding air emissions (gaseous and particulates) experienced during the excavation and treatment trials.	Prior to remedial works.	Confirm the nature of potential air emissions. To assess the likely level of air emissions generated during pit remediation. To assess the likely level of air emissions generated during waste treatment. Review the risk to human health and the environment based on the data gained from the excavation and treatment trials. Assess the performance of the proposed remediation approach.		EPA
Adelaide Street Landfill Environmental Sampling	3	Undertake soil and groundwater sampling.	Prior to remedial works at this site.	To assess the nature and extent of Omex waste contamination at the Adelaide Street landfill facility.		EPA
Level of Remedial Works	4	Remediate the Omex site to the response levels nominated in the CER.	During remedial works.	To ensure contaminated land is remediated to the NEHF Health Investigation Level or where determined by site specific health risk assessment.	HDWA	EPA
On-site Remedial Works	5	Remediate any contamination identified outside the pit area to a depth of 3.5m.	During remedial works.	To ensure contaminated land is remediated to the NEHF Health Investigation Level or where determined by site specific health risk assessment.	HDWA	EPA

Topic	Commitment	Action	Timing	Objectives	On advice from	To the satisfaction of
Execution of Remedial Works	6	Removal of contaminated material in accordance with the site management techniques described in the CER All contaminated material removed from the site will be disposed of in accordance with Landfill Waste Classification and Waste Definitions.	During remedial works.	To minimise the exposure of workers, the public and the environment to contaminated materials	Worksafe WA	EPA Worksafe-WA
Public Consultation	7	Manage the community consultation and communication process by regular newsletters, information sessions for the public, and liaise directly with residents adjacent to the Omex site.	Prior and during remedial works.	To facilitate communication between the residents and the proponent on the performance of the remedial works.		EPA
Contaminated Material Transport	8	In liaison with the Main Roads Department and Bellevue Primary School, prepare a transport management plan for the safe and effective transport of materials to and from the Omex site. All contaminated material transported from the site will be carried in appropriately equipped and labelled trucks in a manner consistent with the Dangerous Goods Regulations.	During remedial works.	To minimise any risks associated with the transportation of contaminated material from the site.	DME MRD	EPA DME
Disposal of Contaminated Material	9	Prepare a waste management plan identifying methods for disposing of solid and liquid waste material and contaminated soil. The ultimate destination of all contaminated material will be selected on the basis of criteria set by the Landfill Waste Classification and Waste Definitions.	Prior and during remedial works.	To ensure all contaminated material from the site is managed and disposed in a manner which reduces environmental impact and risk to human health.		EPA
Dust Discharges	10	Dust discharges from the site will be kept within EPA criteria.	During remedial works.	To ensure that dust discharges during implementation of the project comply with regulatory standards.		EPA

Topic	Commitment	Action	Timing	Objectives	On advice from	To the satisfaction of
Noise Emissions	11	Noise emissions from the site will be kept within the Noise Regulations. Undertake noise monitoring to demonstrate compliance. Noise management if values exceeded.	During remedial works.	To ensure that noise emissions during implementation of the project comply with regulatory standards.		EPA
Air Emissions	12	Air emissions from the site will be kept within the guidelines. Undertake air monitoring to demonstrate compliance.	During remedial works.	To ensure air emissions during implementation of the project comply with criteria set for the protection of human health.	HDWA	EPA HDWA
Drainage	13	Surface water drainage will be kept on site and disposed of appropriately.	During remedial works.	To ensure surface water drainage from contaminated areas of the site is contained and treated if required.		EPA
Vibration	14	Vibration will be kept to a minimum and comply with the Australian Standard.	During remedial works.	To ensure vibration does not affect residents or damage nearby properties.		EPA
Occupational and Public Health	15	An Operational Health and Safety Plan will be developed and implemented prior to remedial works commencing. The plan is to include emergency/contingency planning.	Prior to remedial works.	To ensure remedial works are carried out in a safe manner with no risk to site personnel or the public.	Worksafe WA HDWA	EPA Worksafe WA
Performance of Remedial Works	16	Prepare a validation program of remedial works to demonstrate compliance with EPA site clean-up criteria.	Prior to remedial works.	To ensure compliance with EPA approved clean-up criteria.		EPA

Groundwater Management	17	The proponent will negotiate with relevant government agencies to develop an agreed long term approach to groundwater management at and down hydraulic gradient of the Omex site.	Following remedial works.	To ensure future groundwater quality is managed to protect human health and the environment.	EPA WRC
Performance Review	18	The EPA will advise on the success of the remediation in meeting the conditions of approval for this project.	At completion of remedial works.	To ensure the conditions of approval for the project are achieved.	EPA
Validation Report	19	A report at the completion of the validation program will be submitted to the EPA, which will provide evidence of conformance to the commitments, and Ministerial Conditions for the project.	At completion of remedial works.	To document site clean-up has been performed in accordance with EPA requirements	EPA

Legend:

DME	Department of Minerals and Energy
EPA	Environmental Protection Authority
HDWA	Health Department of Western Australia
MIRD	Main Roads WA
NEHF	National Environmental Health Forum
Worksafe WA	
WRC	Water and Rivers Commission

Appendix 6

Summary of Submissions and Proponent's Response to Submissions

TO	Tom Koskela		
COMPANY	Woodward-Clyde		
FAX NO.	9325 9091		
FROM	David Ross, Environmental		
	Telephone 9220 9401	Facsimile	9325 9897
JOB/FILE NO.	VW 1100/100	Doc No OVW 4211	
DATE	20 July, 1999	NO. OF PAGES	3 (incl this page)
SUBJECT	RESPONSES TO OMEX PUBLIC SUBMISSIONS		

Dear Tom

Please note the following revised responses in reply to your fax dated 9/7/99.

- 2.1.11 There will be an increase in traffic volume should clean fill be sourced other than from the Red Hill landfill facility. Another source is considered unlikely, however should an alternative source to Red Hill be utilised, daily vehicle journeys to and from the Omex site will increase marginally by 20% or as 0.5% of total daily traffic volume on Clayton Street. The time to backfill the remediation works could be increased by up to 4 to 6 weeks.
- 3.1.2 As mentioned in the response, dust will be measured as total and fine or PM₁₀. The fine particulates will be tested for the analytes outlined in Table 7 of the CER being lead and PAH's.
- 3.1.9 Air monitoring for the potential air emissions outlined in Table 7 of the CER will be monitored on a 24 hour basis at the site boundary. Monitoring at the Bellevue Primary School will be during normal school hours including two hours either side of the school day.

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3.1.10 (Second set of questions) The environmental and social issues related to the Kingston site were considered in the formulation of the proposed remediation approach for the Omex site. As mentioned before, the sites are very different in both geology and contaminant characteristics. The Kingston site included gold mining wastes containing cyanide in addition to the acidic oil sludges.

At Kingston, a number of homes were constructed over backfilled waste pits unlike Omex where only one house was constructed over soil contaminated from an earlier spill event from the major pit.

With regard to relocation of residents, hazard characterisation and remediation strategies, these have all been duly considered in terms of the environmental and social site conditions specific to the Omex site.

3.1.14 The proponent proposes to implement a perimeter air monitoring program which will cover all the site boundaries. The proposed approach to the air monitoring program for tendering purposes has been included. This is still in draft and has yet to be finalised but does provide an indication of the likely testing program.

3.2.1 There is likely to be odours emanating from the site during remediation which are of nuisance value rather than a health hazard (ie; malodours from a wastewater treatment plant). The proponent commits to undertaking further characterisation of the air emissions from the waste in an attempt to identify compounds which are malodourous at very low concentrations. This proposed testing program is attached for your information.

3.4.7 Section 4.4.1 *Off-Site* of the CER details the comment that there is no off-site contamination attributable to the major pit. There is however some very low levels of hydrocarbons below relevant groundwater criteria attributable to the oil storage area.

4.5.1 As stated in the earlier response, pH was inadvertently omitted from Table 3 but is noted in Table 5 of the CER. The remaining responses address the other questions.

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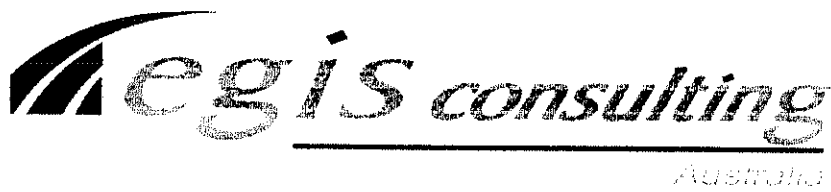
- 4.5.7 A copy of the Golder assessment matrix is attached. The proponent believes that Section 5.3 of the CER and the provided response describe fully the selection of the proposed remediation approach.
- 4.5.8 The proponent considers the provided response addresses the question. The remediation approach was developed with input from the Contaminated Sites Branch of the DEP, Geological Survey of WA, Golder Associates and CMPS&F Engineers and Scientists.

Regards

David Ross

SENIOR ENVIRONMENTAL SCIENTIST

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DOCUMENT NO:VW1100\100

REPORT FOR

OMEX CONSULTATIVE ENVIRONMENTAL REVIEW

Client: **Department of Environmental Protection**
Report: **Omex Response to Submissions**
Date: **10 June 1999**

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Rev	Date	Description	By	Chk	Eng	Appd	Appd
A	6.5.99	Draft Issued to Client	DER	SAB			
0	28.5.99	Final Issued to Client	DER	DEP		DEP	
1	10.6.99	Revised Final Issued to Client	DER	DEP		DEP	

1. INTRODUCTION

**OMEX CONSULTATIVE ENVIRONMENTAL REVIEW
PROPONENT'S RESPONSE TO ISSUES RAISED IN PUBLIC
SUBMISSIONS**

This document forms an addition to the summary of the public submissions previously compiled regarding the Rehabilitation of the OMEX Contaminated Site, Bellevue.

2. MONITORING

- 2.1.1 Although the expectations of the community have previously defined the need for a detailed review of monitoring strategies the CER provided little to no detail in regard to noise, air and groundwater monitoring (development/implementation). Was this a limitation of the CER or an omission?

Response

The proponent has committed to monitoring programs in the CER for all of these factors. The monitoring will be undertaken to the satisfaction of relevant authorities and the EPA. The purpose of the CER was to set performance standards and outline the broad approach to the proposed remediation, to ensure the project is performed in an environmentally and socially acceptable manner.

- 2.1.2 Has a newsletter informing the residents of remediation progress been considered by the proponent? Such a document may include a summary of monitoring results, contact details, operational changes and progress to-date (volumes removed/volume remaining).

Response

Please refer to response 4.1.2 of the initial questions.

- 2.1.3 Can the proponent provide the 'recognised response levels used for the protection of human health', and the basis upon which the clean-up depth of 3.5m (for areas external to the pit) was derived using these criteria?

Response

The health based response levels are from the 1996 National Environmental Health Forum Monographs, Soil Series No.1 as outlined in both the CER and appendices; Health Risk Assessment report. The clean-up depth of 3.5 m was based on exclusion of reasonable potential human access such as during the excavation of a swimming pool. It was also based on the knowledge that there is minimal contamination of soils around the pit that extend to a depth greater than 3 m below ground level.

The 1992 ANZECC Guidelines for the Assessment and Management of Contaminated Sites (p.42) specify that a clean soil cover of 0.5 m offers a high level of protection for normal situations. A clean-up depth of 3.5 m is considered conservative and protective of human health.

- 2.1.4 Section 4.5 (pg50) states '...no air monitoring data was available before the pit was covered'. However, OMEX was prosecuted in 1979 for offensive odours. Why hasn't the monitoring data used in this case been incorporated within the CER?

Response

Only information which has been quantified has been included in the CER. Offensive odours although a nuisance, are subjective and cannot be reasonably quantified. The proponent is aware that the refining facility that operated on the site had a history of complaints regarding the generation of offensive odours.

- 2.1.5 Section 6.2.2 states 'The excavated pit will initially be backfilled with clean fill...'. This statement suggests that backfill will be removed/replaced at a later date. Please clarify this statement.

Response

The pit will be backfilled with clean soil and then with 3 m of compacted clay once the waste contents are removed.

- 2.1.6 Will the groundwater bore and surface soils at the Bellevue Primary School be continuously monitored?

Response

The groundwater monitor and production bore will be incorporated into a groundwater monitoring program as detailed in Section 6.5.2 of the CER. This will be performed to the satisfaction of WRC and the EPA. There is no justification for testing of the surface soils. There will be air monitoring within the school grounds when the pit is exposed, during the excavation phase of remediation.

- 2.1.7 Will the proponent detail the systems, equipment and methodology to be used in conducting on-going monitoring both on and off the OMEX site after remediation is complete? Who will manage this monitoring? How will it be financed and who will assess the results?

Response

Groundwater monitoring is proposed for the post remediation phase. The details and frequency of sampling will be determined in consultation with the WRC and EPA. Monitoring will most likely be performed by the WRC in consultation with the EPA or a suitably qualified environmental consultant. Review will be conducted by the WRC and EPA. **The Water and Rivers Commission will be responsible for all monitoring costs.**

- 2.1.8 Does the HDWA accept the CER's incremental lifetime risk of cancer value of 1 in 10^{-5} as being acceptable or should this value be 1 in 10^{-6} ?

Response

In health risk assessment, commonly adopted levels of acceptable cancer risk are normally in the range of between 10^{-4} to 10^{-6} or one additional cancer per 10,000 to 1,000,000 people per lifetime. The HDWA has reviewed the Health Risk Assessment and considers a value of 10^{-5} is within the range of acceptable risk.

- 2.1.9 Will the proponent undertake background/baseline monitoring for noise and air quality impacts prior to the proposed remediation works?

Response

The proponent will undertake baseline air monitoring for those compounds nominated in Table 7 of the CER prior to remediation work commencing. There will be no background noise monitoring as the proponent will be required to comply with the Noise Regulations.

- 2.1.10 The final capping of the site once backfilled will impede infiltration. How will run-off from the OMEX site be dealt with? Will run-off be periodically monitored and who will have this responsibility?

Response

Surface water management is outlined in Section 7.6 of the CER. The compacted clay layer will be of the same type of material as occurs throughout the site currently. It will be graded to ensure surface runoff infiltrates outside of the remediated pit and containment wall. As the cap will be constructed of clean clay, there is no need to monitor the stormwater quality.

- 2.1.11 Upon commencing remediation works will preliminary air quality monitoring (reality checking) be conducted so as to more accurately define the types and concentrations of airborne contaminants before full scale work continues?

Response

Prior to commencing remediation work at the site the proponent commits to conducting an air sampling and trial excavation of the pit for a full suite of organic compounds, in addition to those contaminants outlined in Table 7 of the CER. The results of this program will identify the contaminants to be monitored during remediation.

- 2.1.12 The human health effects studied during excavation and remediation of the McColl Superfund Site in Fullerton California (1990, EPA) provided a detailed approach to 'real time' monitoring. Has the proponent considered the results of this and similar studies when defining its approach to protecting public health?

Response

The proponent will undertake air monitoring for those contaminants described in Table 7 of the CER. **Real time or instantaneous monitoring** will be performed for the compounds sulphur dioxide, benzene and fine particulates. Lead and PAHs require a high volume air sampler to obtain sufficient sample for laboratory analyses and therefore cannot be instantaneously monitored. Results will be obtained within 48 hours of the sampling period.

3. REMEDIATIONS

- 3.1.1 The CER should clearly state that Lots 48-61 are contaminated and will be included in remediation. Does the proponent intend to undertake the remediation of Lots 48-61?

Response

Lots 48 to 61 make up all the properties identified under improvement plan 30 and form the boundary of the Omex contaminated site. This is shown on Figure 3 of the CER. All contaminated soil exceeding the proposed clean-up criteria within the boundary of the site will be remediated to a depth of 3.5 m. The extent of soil contamination at the Omex site is also detailed in Figure 7 of the CER.

- 3.1.2 The limited assessment of the waste located in pits 2 and 3 on lots 130 and 136 from only 1 soilbore suggests that further characterisation of the waste materials may be required. Will this characterisation be undertaken by the proponent?

Response

Pits No. 2 and 3 located on Lots 130 and 136 have been subject to more extensive testing than stated in the above submission. A total of eight soil bores were sampled in these two pits. Six on Lot 130 and two on Lot 136.

The results are outlined in Sections 4.3.7 and 4.3.8 of the CER and indicate that the contamination is not related to the waste material from Omex site. As such no further characterisation will be undertaken. This land is also privately owned and outside the boundary of the improvement plan.

- 3.1.3 Although lots 130 and 136 have been acknowledged as containing non OMEX related waste the CER does not clearly state whether these lots will be included within the remediation program. Please clarify.

Response

No Omex related contamination was detected in either of the pits on the two locations. There is some migration of contamination on both lots from Pit No. 1 and the old refinery location. The extent of inferred migration is minor and is shown on Figure 7 of the CER. This contamination will be remediated as part of the proposed clean-up.

- 3.1.4 Lots 57 and 58 also make up part of the OMEX site, however, no comment regarding investigation or remediation of these two parcels of land has been made within the CER. Will remediation be conducted?

Response

Lots 57 and 58 comprise the Oil Redrumming Facility, the nature and extent of contamination of which is detailed in Section 4.3.6 of the CER. A total of 11 soil bores were installed across the lots. Remediation to 3.5 metres will be conducted as identified by results of the soil sampling conducted across the site.

- 3.1.5 Dewatering of the waste pit has the capacity to enhance the volatilisation of organic compounds. Has this process been considered in determining the extent of odour, operational risks (fire) and human health impacts?

Response

The proponent has considered the issue of air emissions arising during the dewatering phase, this is described in detail in Sections 6.3 and 7.2 of the CER. Dewatering of the pit would increase the pore air space within the waste. Any volatile compounds would therefore have a higher potential to volatilise than when the pit is full of liquid. Characterisation of both the solid and liquid component of the waste is described on Tables 11 and 12 respectively of the CER.

The solid waste contains minimal levels of volatile compounds. Volatile hydrocarbon levels are between 14 mg/kg and 79 mg/kg compared to semi-volatile and heavy fraction hydrocarbons ranging between 1,100 mg/kg and 9,400 mg/kg. Volatile hydrocarbons are more hazardous to human health than low volatility hydrocarbons due to multiple exposure pathways and environmental mobility. The proposed response criteria of 65 mg/kg for volatile hydrocarbons is based on direct soil contact.

The oil component of the liquid waste contains about 2% volatile hydrocarbons. The source of which will be removed by dewatering, reducing the amount of volatile hydrocarbons available to form vapours. Any emissions would be related to residual oil sorbed onto the solid waste.

It is our opinion that the observed hydrocarbon levels do not represent a fire hazard and are highly unlikely to create significant hydrocarbon vapour emissions.

- 3.1.6 Table 3 defines a contingency plan should emissions exceed acceptable limits. Will the proponent provide this plan?

Response

The contingency plan will be required to be produced by the remediation contractor prior to works commencing. This is required as part of remediation works program which is Commitment No.2 of the CER. The contingency plan will be to the satisfaction of the EPA.

- 3.1.7 The last groundwater bore census was undertaken 4 years ago. Has a more recent local field search/questionnaire of bores surrounding the OMEX site been undertaken?

Response

Of particular relevance to this site is the groundwater in the Leederville Formation which is at depths greater than 20 metres. To access this water requires drillers and a licence issued by WRC. Since this bore census no licences have been issued by the WRC in the nearby area, due to the status of the groundwater contamination.

- 3.1.8 A timeline/program for clean-up of the Adelaide Street Landfill site was not defined within the CER. Will this location be addressed as per the Minister's commitment? Please detail.

Response

The CER commits to remediation as outlined in Commitment No.1. The timeframe is contingent on access to the site which is expected in about two years time (Section 4.2.3 of the CER).

- 3.1.9 The Contaminated Sites Branch of the DEP (regulators) will require all monitoring reports (noise, dust, air emission and groundwater etc.) to be submitted on a regular basis. How will these be provided and at what frequency?

Response

All results will be made available to the EPA and Contaminated Sites Branch of the DEP. Immediate access to results will be facilitated via fax or electronic mail if required. Monitoring summaries or reports are proposed be on a monthly basis with validation results at the completion of the remediation phase.

- 3.1.10 Dewatering is likely to elevate oxygen concentrations within the waste materials creating a more aerobic environment. Has this been considered by the proponent and what are the implications for remediation?

Response

Dewatering will increase air pore space and elevate oxygen levels. This will produce oxidising conditions which has the potential to increase microbial activity within the waste material. It is expected that the period between dewatering and excavation will be short and thus the impact of these conditions will be negligible.

- 3.1.11 Considering the similarities between the Kingston contaminated site (Qld.) and the OMEX site in Bellevue has the proponent reviewed the approaches taken by the Queensland Government in relation to relocation of residents, hazard characterisation and remediation strategies?

Response

The Kingston site has been examined by the proponent and the two sites are very different in nature.

The proposed remediation approach for the Omex site has been taken a step further than Kingston as it includes total removal of the waste material rather than just containment. Site specific conditions have been considered and the WA

Government has elected to remove the source of the contamination associated with the site.

- 3.1.12 Will the proponent comment on the letter provided by Dr Peter N Di Marco (PhD) (11 March 1998) which stated, 'As was the case in Kingston, it is possible that some Bellevue residents may be currently suffering various health effects as a consequence of stress because they live in the proximity of the site (although not directly caused by the contaminants in the pit)'. How does this affect the preferred approach to site remediation?

Response

By remediating the site the proponent is removing the potential health hazard and alleviating the concerns of nearby residents. All precautions have and will be undertaken to ensure the clean-up is undertaken quickly with minimal inconvenience and stress to residents.

The physical health of the local community is paramount and the criteria relating to human health govern the work practices adopted and monitoring during remediation. The physical health and well being of local residents will not be compromised during the clean-up.

- 3.1.13 In comparison with the Kingston contaminated site in Queensland, the OMEX site has not been assessed with the same detailed investigations concerning hazard identification, site assessment, site history or public health. Considering this lack in background knowledge how can the proponent state, with confidence, that the risks to the community and surrounding environments have been adequately defined?

Response

The Omex site has been subject to a number of environmental investigations dating back to 1988. The nature and extent of contamination has been thoroughly assessed both in the pit, the surrounding soil, underlying groundwater and potential air emissions.

The proponent is confident the site has been sufficiently investigated to warrant commencement of remedial work. In order to demonstrate the suitability of the proposed remediation approach, the proponent commits to undertaking a trial excavation and treatment exercise prior to remediation work commencing. This will be carried out to the satisfaction of the EPA.

- 3.1.14 Why has the CER ignored the need for a buffer zone? Please comment in regard to the EPA Policies for EIA No3 - Industrial - Residential Buffer Areas (separation distances) and the WA Planning Commissions "State Industrial Buffer Policy"?

Response

The purpose of buffer zones in EPA Policies for EIA No.3 is to provide guidance in relation to proximity of industrial activities to residential areas and potential environmental effects. Remediation of the Omex site is not a permanent industrial complex and is a temporary activity to facilitate improvement of an undesirable environmental and human health issue. The intent of the buffer policies in EPA Policies for EIA No.3 does not apply to the rehabilitation of contaminated land, only to permanent land use.

For the Omex site, consideration was given to health effects during remediation and an appropriate buffer zone identified with respect to nearby residents. Purchase or relocation was offered within this zone.

- 3.1.15 Is the proponent aware that construction of the containment wall in December 1998 caused an increased accumulation of dust around neighboring properties? This was accompanied by noise and vibration levels which were considered excessive at times. How will the proponent address these issues?

Response

During the construction of the containment wall only five complaints were received, two of which were for dust which originated from the limestone roads on site. No complaints were received for noise or vibration during these works.

The proponent will ensure that remediation of the Omex site will conform to the commitments and approaches outlined in the CER. The issues of dust, noise and vibration are all addressed and have conformance requirements as outlined in the CER and subject to regulatory standards.

- 3.1.16 Although unsubstantiated within the investigations at the McColl Superfund Site (1990) the report suggests, "...a direct chemical effect of acidic petroleum sludge wastes on acute health complaints..". Considering the highly controlled

environment in which excavations were undertaken (an impervious tent under negative pressure) will the proponent reassess the potential health risk to the surrounding residents?

Response

The proposed remediation of the Omex site has been the subject of a health risk assessment which has resulted in establishment of performance criteria specific to the Omex site, to ensure the health of residents is not compromised.

The remediation contractor will be required to conform to these criteria and may utilise such measures as a cover to achieve this. The proponent believes based on the current knowledge, that a cover is not required to manage air emissions.

4. GENERAL ISSUES

- 4.1.1 Inconsistencies in wording of the CER seems to generate confusion, particularly in regard to the extent of site clean-up. The executive summary, pg50 and pg88 define a strategy which removes all liquid and soil contents of the contaminated pits. However, only 30% of liquid removal is quoted in Table 3. A similarly vague statement on pg15 states '...remove all the waste material within and adjacent to the pit which poses a real human health risk.' How is 'real human health risk' defined?

Response

All of the solid and liquid waste component of the pit will be removed. The 30% recovery figure relates to the ability to dewater. The remaining 70% of liquid will be recovered along with the solid waste during the excavation stage. The term real human risk refers to human toxic or carcinogenic effects rather than substances or contaminant levels which may compromise environmental receptors.

- 4.1.1.1 Compounding this confusion further are the accompanying figures. Figure 7 depicts waste in the pits to a depth of approximately 7 m compared to a clean-up depth of 3.5m. This value appears to conflict with figure 11 which suggests the full removal of waste material to a depth of 7 m. Will the proponent accurately define the proposed depth of all excavations to be conducted at the OMEX site?

Response

The CER states that the entire contents of the pit will be removed to the predicted pit depth of 7 m. This is pictorially illustrated on Figure 11 of the CER. Soil surrounding the pit will be excavated to a maximum depth of 3.5 m.

- 4.1.2 Given that the bentonite containment wall was installed in December 1998 will the proponent remove reference to the proposed bentonite containment wall within the CER?

Response

The CER refers to the bentonite wall as complete and in place.

- 4.1.3 Considering that the Dutch 1994 guidelines will not be used as an assessment tool (CER, pg18) why have they been referenced within the CER?

Response

Section 3.3.2 of the CER describes the relevance of the 1994 Dutch Intervention criteria to the Omex site, they are for information purposes regarding generic soil clean-up criteria and for the assessment of total petroleum hydrocarbons in groundwater where there are no Dutch 1983 or ANZECC values.

- 4.1.4 Can the proponent define the process by which breaches of the alert and action levels will be communicated to the Contaminated Sites Branch of the DEP (regulators) and the general public?

Response

The alert and action level approach documented in the CER will be used as a management tool to ensure that air quality off site does not exceed health standards. Should action levels be reached at the boundary of the site, work creating the breach will cease immediately.

The proponent will commit to developing a suitable communication framework with residents immediately adjacent to the site so that they can be notified of breaches and the outcome of remedial action taken.

All monitoring records will be available to the Contaminated Sites Branch. Collection of results will be in the form of continuous data logs showing instantaneous results against real time or hand written log sheets in the case of random location monitoring.

- 4.1.5 Can the proponent detail the actions it intends to take to substantially improve security and public safety at the OMEX site?

Response

Public safety and security is addressed in Section 7.9 of the CER. The proponent believes the proposed measures are adequate to deter trespassers.

- 4.1.6 The Contaminated Sites Branch of the DEP does not use the Draft WAWQ (EPA, 1994) guidelines for assigning investigation or response levels to surface or groundwaters as stated in section 3.3.4 (pg20). Will the proponent reconfirm that all water quality assessment criteria are based upon the ANZECC Water Quality Guidelines for Fresh and Marine Waters (1992) and the ANZECC Australian Drinking Water Guidelines (1996)? These should also be consistent with the proposed NEPM for contamination assessment.

Response

The EPA Guidelines requested that the proponent assess all contaminated groundwater against the Draft WA Guidelines for Fresh and Marine Waters 1993 Bulletin 711. Section 3.3.4 of the CER describes the derivation of these guidelines with regard to the ANZECC Water Quality Guidelines for Fresh and Marine Waters (1992) as they are effectively the same. The reference section of the CER has quoted the Draft Australian Drinking Water Guidelines which were finalised in 1996. The 1996 guidelines are effectively the same as the draft with no implication to the assessment of the groundwater contamination.

- 4.1.7 The DEP has not yet endorsed the use of NEHF guideline levels in site assessments due to outstanding public comment required under the NEPM for the assessment of site contamination. In lieu of these guidelines the ANZECC 'B' investigation levels are used to trigger further site specific HRA investigations. The proponent is required to change the criteria (Section 3.4.1, p22) accordingly?

Response

Assessment of the Omex site has been based on comparison with the ANZECC Environmental Investigation B level or Dutch B 1983 criteria in its absence as outlined in Section 3.3.2 of the CER. The National Environmental Health Forum Health-based soil investigation levels have not been used in the assessment of soil contamination.

- 4.1.8 NEHF guideline values are intended to trigger a site specific HRA and not be used as site clean-up level values. Appendix B does not indicate if site specific HRA data has been used to establish clean-up criteria. Please clarify?

Response

The Health Risk Assessment (HRA) performed for the site has proposed the NEHF Health Investigation Levels (HIL) Exposure Setting A (Standard Residential) as an acceptable maximum contaminant concentration for protection of public health. The HRA states that local or national established criteria should be first applied with criteria specifically developed where there is none. The NEHF "investigation levels provide a trigger to assist in judging whether a detailed investigation of a site is necessary" from a human health perspective. Contaminant levels in excess of the HIL do not necessarily represent a risk to human health. The health levels are akin to ANZECC B for environmental assessment.

The HRA considered site specific factors and exposure pathways related to the Omex site. Site lithology is clay with useable groundwater resources at a significant depth. The site is not located near any sensitive environmental receptors. The end landuse would be moderate density residential (400 m² lots) with minimal land available for home food production and no poultry. Groundwater consumption or even access could be excluded via existing licensing regulations. The contamination exhibited negligible levels of volatile compounds so excluding the possible exposure pathway of vapour inhalation. Based on the site specific characteristics of the Omex site, application of the NEHF HIL value was considered to be a suitable response or clean-up criteria.

- 4.1.9 It appears from the CER that validation of the major pit will be via visual inspection. The Contaminated Sites Branch will require validation sampling and analysis to be undertaken before accepting the pit as being remediated. Can the proponent detail its methodology for validation assessment and approval?

Response

Validation sampling of the pit is outlined in Section 6.3.2 of the CER and will comprise both a visual inspection and geotechnical testing to confirm insitu soil and that all the waste contents have been removed. The top 3.5 m of the pit wall will also be subject to analytical validation testing as health based soil clean-up criteria applies to this depth interval.

- 4.1.10 Can the proponent clarify the source of emissions criteria as noted within the CER (Executive Summary, pg ii)?

Response

Details of the air emissions are shown on Table 7 and are described in Section 3.4.2 of the CER. Sulphur dioxide, lead and fine particulate standards are the 1998 NEPM Measure for Ambient Air Quality. The PAH criteria has been derived as part of the HRA and is based on toxicological information provided by the US EPA Integrated Risk Information System.

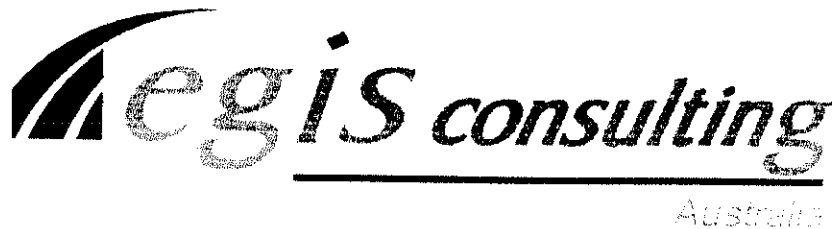
No criterion exists for benzene which was adopted from levels used in the remediation of service station sites in WA. This information was provided by the Contaminated Sites Branch of the DEP.

- 4.1.11 Although perceived by the public as a real threat/problem section 1.6 gives scant attention to the issue of air emissions. Can the proponent clarify their position on this issue?

Response

Section 1.6 of the CER is an introductory section only. Comprehensive discussion on air emissions is provided in Sections 3.4.2, 4.5, 6.6 and 7.2 of the CER. The proponent considers air emissions to be the primary environmental issue associated with the proposed remediation and as such as provided detailed assessments and commitments to managing this issue.

In addition the proponent will commit to additional air emission investigations and mixing trials (3.1.13) prior to commencing remediation.



DOCUMENT NO:VW1100/100

REPORT FOR

OMEX CONSULTATIVE ENVIRONMENTAL REVIEW

Client: **Department of Environmental Protection**
Report: **Omex Response to Submissions**
Date: **10 June 1999**

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Rev	Date	Description	By	Chk	Eng	Appd	Appd
A	13.4.99	Draft Issued to Client	DER	SAB			
0	28.5.99	Final Issued to Client	DER	DEP		DEP	
1	10.6.99	Revised Final Issued to Client	DER	DEP			

1. INTRODUCTION

OMEX CONSULTATIVE ENVIRONMENTAL REVIEW

**PROPONENT'S RESPONSE TO ISSUES RAISED
IN PUBLIC SUBMISSIONS**

This document forms the principal summary of the public submissions regarding the Rehabilitation of the OMEX Contaminated Site, Bellevue.

A number of submissions were received from government departments including: the Midland District Police Office, Water and Rivers Commission, Main Roads Department, WA Health Department, Shire of Swan and the CSIRO (Centre for Groundwater Studies).

Individual and group submissions were also reviewed from: the Bellevue Returned Services Community & Sporting Club, Bellevue Primary School P&C Association, MPL (Environmental Consultants), The Bellevue Action Group, Avon Clean & Green, The Clean Air Committee, Dingle & Bird (Environmental Consultants) and the OMEX Site Remediation Implementation Consultative Committee.

2. TRANSPORT

2.1 ROAD SAFETY

2.1.1 With increased traffic flows, in particular heavy vehicle movements, concern is held regarding the safety of local school children and other members of the public. Children will be the most vulnerable to these changing road conditions, particularly when walking to and from school. It is recommended that this should involve;

- employing extra crossing guards at appropriate locations;
- restricting heavy vehicles to designated transport routes at all times; and research into preferred routes taken by school children.

Will the proponent implement this?

Response

The proponent will ensure that the contractor responsible for the clean-up keeps to the designated route and that heavy vehicles operate in accordance with traffic regulations. Liaison with the principal of the local school to identify methods to limit potential risk will occur. This may include additional warning signs or crossing guards on Purton Pl. It should be noted that haulage vehicles will not use Clayton St in front of the school.

2.1.2 The proposed route for trucks servicing the OMEX site has been considered unacceptable by many of the submissions. The Department of Main Roads and Midland Police prefer the route as follows:

- Exit OMEX site, travel west along Rason Parade;
- Turn right into Clayton Street and travel west;
- Turn left into Military Road and travel south;
- Turn right into Bushmead Road and travel west;
- Turn left into Stirling Crescent and travel south;
- Turn left into Great Eastern Highway Bypass and travel east (continue east on Great Eastern Highway if heading to Mount Walton);
- Turn left into Roe Highway and travel north; and then
- Turn right into Toodyay Road and travel east to the Redhill Landfill Facility.

Will the proponent accept this preferred transport route?

Response

The proponent recognises the difficulty in making an uncontrolled right hand turn onto Gt Eastern Hwy from Bushby St. The nearest available controlled right hand turn onto the highway is at Lloyd St towards Midland. This is a major intersection and has a right controlled turn which would be suitable for heavy vehicles. Therefore the proponent considers the proposed exit route from the site should be changed to Lloyd St rather than the proposed Bushby St access to Gt Eastern Hwy. The proposed return route to the site is considered appropriate.

In response to the Main Roads and Police alternative route, given that the waste is not dangerous and will be treated and covered, the proponent believes there is no real benefit in using this route. There would be an extra 5 km placed onto the trip which includes a difficult uncontrolled right hand turn from Military Rd onto Bushmead Rd.

Main Roads (C Wooldridge, Acting Traffic Manager) has been contacted regarding the new proposed route and considers it acceptable

- 2.1.3 What contingency plans are in place for accidents involving toxic materials destined for Mount Walton or the liquid waste treatment facility at Forrestdale?

Response

Road transport of treated solid and liquid wastes will be in accordance with Section 7.7 of the CER which outlines the measures to ensure the waste is transported in a manner as safe as possible. Included is the need for an emergency response plan which is to be prepared by the remediation contractor.

In addition, the State has a plan for such road transport emergencies known as Westplan Hazmat. The DEP is a primary response agency. The proponent will provide a description of the material, transport times and routes to FESA with list of contacts in the event of an incident

- 2.1.4 Has a suitable transport route been defined for the movement of liquid wastes to the Forrestdale liquid waste treatment facility? If so, what is it?

Response

Selection of the transport route to Forrestdale will be based on the DME Guidance Note T117 as per the solid waste. This guideline recommends that the transport route is kept to the major road network and that congested and environmentally

sensitive areas are avoided. The likely route would therefore be south along Roe, Tonkin and then Albany Highways, west along Lake Road and Armadale Road to the liquid waste treatment facility.

Main Roads (C Wooldridge, Acting Traffic Manager) has been contacted regarding the proposed route and considers it acceptable.

- 2.1.5 Has the transport of liquid waste from the site been considered in the estimates for heavy vehicle movements generated by the project?

Response

Vehicle traffic associated with the liquid waste disposal is accommodated in the daily figure nominated in the CER. There will be approximately 150 journeys from the site associated with the waste oil/liquor transport compared to some 4,000 exit journeys associated with the solid component.

- 2.1.6 The Department of Minerals and Energy (Chemistry Centre, 1994) made comments that "...the high acidity, lead and PAH levels in the oil waste renders it a very hazardous material". What permits will be required for the movement of treated and untreated liquid and solid wastes from the OMEX site?

Response

In an untreated form, the sludge is acidic and presents a health hazard on contact. Once treated, the waste is not considered to be dangerous and as a consequence can be carted without restriction (contact made with Peter Drygala, Manager Transport, Department of Minerals and Energy).

Therefore the solid waste will be transported off-site in a treated form. The acidity will be neutralised which is the primary hazard associated with the waste and there will be no need for permits.

Liquid waste will also be treated on-site for pH and transported in accordance with the requirements of the Environmental Protection (Liquid Waste) Regulations 1996. A permit for the transport of liquid waste will be required under these regulations.

- 2.1.7 How will the determination of waste type (i.e. Class III, Class IV, Class V etc.) be managed so that materials end up at the appropriate class landfill? Will load sampling and testing be undertaken? (Please detail your response)

Response

Section 6.3.1 of the CER outlines the clean-up strategy which includes characterisation of the treated wastes. Samples will be taken from the treated waste prior to transport off-site and tested for relevant contaminants including leachate potential. Laboratory results will be compared against the Landfill Waste Classification and Waste Definitions to determine which class of landfill (i.e. Class II, III, IV or V) the material should be disposed to.

The number of samples required to confirm the landfill class of the waste will be a statistically based method acceptable to both the EPA and landfill operator. A likely figure is one confirmation sample per 250m³ of waste. The waste will be tested for a selection of compounds as described in Table 11 of the CER.

- 2.1.8 Under what specifications and on who's authority, will the waste transport trucks be deemed 'properly sealed' as stated in the CER?

Response

Properly sealed as described in the CER is where the waste is securely contained. This will include the use of tarpaulins, plastic sealing of tailgates and the practice of underloading. The contractor will be responsible for managing the transport and ensuring the loads are suitably contained. The Waste Transport Register which is required to be maintained by the contractor (refer Section 7.7 of CER) will include a checklist for each load that leaves the site. This will provide documented evidence that each load has been inspected. The loads will be also be inspected at regular intervals by the superintendent and EPA representatives to audit compliance. Audits may occur either on-site or at the landfill facility.

- 2.1.9 Who will undertake regular maintenance and conformance checks to ensure the continued suitability of waste transport vehicles?

Response

As per response 2.1.8. The checklist will include vehicle identification, driver, departure time and details/signature of the remediation contractors staff undertaking the load check. Audit results will include the same information with the exception of the author's signature rather than the contractor's staff. The

remediation contractor will need to provide evidence that all trucks have recently been subject to a roadworthiness test prior to remedial works commencing.

- 2.1.10 Liquid commonly settles out of 'solid' loads during transport. Has this been considered by the proponent and what steps will be implemented for its management?

Response

Yes it has been considered. It will be the responsibility of the contractor to ensure that excess liquid waste does not pose a threat to the environment during transport. The waste will be treated with limestone or equivalent which will absorb any excess moisture contained within the waste. The waste will also stand for a period after treatment. The waste will be examined for excessive moisture content by the contractor's representative responsible for checking the load and at random by the superintendent as per the above responses. The acceptance criteria for the waste is no free liquid and a moisture content of no more than 40%. In addition to on-site personnel, the landfill operator will inspect incoming loads to ensure these criteria are being met. The landfill operator will nominate the testing requirements for determining moisture content.

- 2.1.11 A similar volume of material as that removed from the site will need to be brought back in as clean fill. Have these transport movements and their routes been considered in managing risks to road users and impact on the local community?

Response

The truck estimates quoted in CER included the need to bring clean material back to the site, however, it is most likely the clean backfill will be sourced from the Red Hill landfill site and backloaded to the site, thus reducing traffic movement.

3. POLLUTION MANAGEMENT

3.1 GENERAL ATMOSPHERIC EMISSIONS

- 3.1.1 To limit issues of perceived bias, will independent professionals be employed to conduct the air monitoring program during site remediation activities?

Response

The air monitoring is proposed to be part of the remediation contract, and as a consequence, will be undertaken by the contractor. The results will be continuously monitored by the superintendent (proponent's representative) with regular summaries provided to both the EPA and Pollution Prevention Division of the DEP. The superintendent will also undertake air sampling independent of the contractor to audit the monitoring program. The contractor will be required to provide evidence of compliance to the air emissions standards nominated in Table 7 of the CER in the form of continuous data logs.

- 3.1.2 It is expected that dust will be generated when remediation works commence at the OMEX site. Will this dust be monitored and regularly tested for the management of possible human health effects?

Response

Dust will be measured as part of the continuous air monitoring program. The two dust components that will be measured are total dust and PM₁₀ or the fine particulate size less than 10 microns or micrometres. The fine particulates represent a potential health hazard whereas the total dust is a nuisance. Total dust will be monitored on a regular basis along with fine particulates PM₁₀ which will be monitored on a continuous basis.

- 3.1.3 Given the heterogenous nature of the OMEX wastes, will regular sampling be undertaken to reassess the emission potential of the progressively exposed materials?

Response

Sampling to date has shown that the waste materials tend to be layered and change in character with depth. The surface deposits of the pit tend to contain more fill with sludges dominating at depth. Previous air studies were based on

the most contaminated samples obtained at depth rather than a diluted full pit profile. These studies identified sulphur dioxide as a major air emission.

Air emissions emanating from the pit will be subject to continuous air monitoring during the remediation phase. So as different profiles of the pit are exposed, any air emissions will be detected, quantified and assessed against the air criteria.

The proponent will also commit to undertaking further air emissions testing of the pit prior to remedial works commencing. This will involve testing of the air emissions from different profiles within the pit. This information will provide the remediation contractor with background information regarding the air emission potential for different profiles within the pit and so aid in the management of air emissions during the clean-up.

- 3.1.4 Will the detailed air monitoring plan and response strategy be submitted to the Western Australian Department of Environmental Protection (WA DEP) and Health Department of Western Australia (HDWA) for assessment of their adequacy?

Response

The proposed air monitoring program will be determined in consultation with the EPA and HDWA to ensure its adequacy. The remediation contractor will be required to fully comply with monitoring requirements of the final program.

- 3.1.5 How was the shutdown value of five times the National Environmental Protection Measurement for ambient air quality reached (CER, Section 3.4.2 - page 23)?

Response

The five times value or action level equates to immediate closure of remedial works. A factor of 5 was applied as nearly all of the criteria apply to daily exposure, therefore some variation in levels is tolerated as long as the daily value is achieved. Application of a lower factor would introduce excessive conservatism as the proposed 5 times or action level is significantly lower than the occupational level. For example, the public health action level for an instantaneous sulphur dioxide level is 1 ppm whereas the overall occupational limit for 8 hours of exposure is 2 ppm.

- 3.1.6 It is assumed that a lag period between particulate contamination events (airborne lead etc.) and results from particulate testing will exist. A maximum of 48 hours is considered appropriate for reporting these results. Does the proponent accept this time frame and how will results be reported to the local community?

Response

A lag period in air testing will apply to the lead and PAH's as they require to be collected in a high volume air sampler whereas the other contaminants can be tested for immediately. A 48 hour turnaround for lead and PAH's is considered appropriate as the nominated air emission standards are for a period of one year as distinct from instantaneous or even daily values.

Results will be reported two days following the sampling event. It is proposed to report these results in a monthly summary to the EPA and Pollution Prevention Division of the DEP. Results could also be accessed by the authorities as soon as they become available. Air monitoring summaries would be reported to the community through the current newsletter.

- 3.1.7 Will the proponent install continuous air quality monitoring devices at intervals away from the OMEX site to determine the extent off-site impacts?

Response

Air monitoring is proposed at the site boundary which represents the location at which contaminants will be highest offsite. Monitoring will also be continuously undertaken at the primary school for sulphur dioxide which is considered the most sensitive receptor during operational hours.

Air monitoring is not considered necessary at intervals away from the site as it will be conducted at the site boundary. Should air emissions at the site boundary exceed the action level, remedial work will stop. Monitoring beyond the boundary therefore becomes unnecessary.

- 3.1.8 It can be expected that remediation of the sites acidic wastes with limestone or similar alkalis will generate gaseous emissions within the mixing trommel. What will be done to monitor and treat these emissions?

Response

The air emissions generated from any treatment on-site such as the trommel will be subject to the criteria nominated in Table 7 of the CER. Should fugitive

emissions cause unacceptable air quality at the site boundary, the remediation contractor will be required to cease operations until the issue can be safely managed.

- 3.1.9 A particular case study of PAH compounds within urban air (University of Leeds, UK) highlighted the impact of nocturnal temperature inversions on PAH concentrations. The report indicated that the levels recorded posed a threat to human health and deserved further analysis.

Sawicki (1976) calculated that a normal person inhaling benzo[a]pyrene at a level of 1 ng/m³ would be inhaling the equivalent of 1 cigarette a day. Over the 12 hour period of the inversion inhalation of benzo[a]pyrene would be equivalent to that associated with around 20 cigarettes.

Source: http://www.chem.leeds.ac.uk/papers/html/pahmosaic/section3_5.html

Have the impacts of temperature inversions on contaminant concentrations been considered in the CER? Will monitoring be conducted on a 24 hour basis so as to define the occurrence and effects of any such event?

Response

The contractor will not be permitted to operate at night and thus emissions at night are not expected to approach those produced during the day. The air monitoring program will continue throughout the night during the remediation phase. Atmospheric conditions will be monitored as part of that program. Should inversions reduce air mixing capacity, the monitoring program will pick up the corresponding elevated contaminant levels.

The health implications from benzo(a)pyrene have been assessed as part of a health risk assessment. The inhalation criteria derived for the site is based on an incremental lifetime risk of developing cancer at a probability of 1 in 100,000 from a full year of exposure, 24 hours a day for 365 days. Given that the remedial works are for less than four months at 60 hours per week, the health derived criteria assumes nearly 9 times more than the amount of expected exposure. The level of risk is considered acceptable from a public health perspective and is comparable to being struck by lightning (3 in 100,000 risk)

- 3.1.10 Why hasn't a buffer zone been considered appropriate for the management of human health risks at the OMEX site?

Response

The Omex site does have a buffer zone surrounding the major pit of 60 m to the nearest street boundary (Clayton Street). The residences immediately on the western boundary of the pit along Henkin Street have now been demolished or vacated prior to the remediation as they were considered to be too close to the remedial works. The eastern part of the site is bounded by a service station and sporting complex.

- 3.1.11 Considering the possible human health and social impacts associated with the emission of toxic and nuisance gases from the OMEX site why hasn't a review of air modelling data been included within the CER?

Response

Air emissions from the waste have been the subject of a number of studies which have identified particular contaminants. The laboratory headspace tests have provided an indication of the magnitude of contaminant emissions, which is considered to be manageable.

The proponent will commit to undertaking an excavation trial in the pit and monitor the magnitude of air emissions. This will be a pilot trial of the proposed remediation phase and should provide evidence that pit emissions can be safely managed (refer Stage 2 proposal). Emissions to air from the site will be a function of the operations of the contractor on a day to day basis.

Given the vagaries of computer modelling of air emissions for a variable source and the commitment by the remediation contractor to manage air emissions to the criteria nominated in Table 7 of the CER, such modelling was not considered necessary.

- 3.1.12 Will acid gas monitoring be incorporated into the proposed air emission monitoring program? Is the formula used to derive alert and action levels (Table 7) suitable for application to these substances?

Response

As acid vapours have not been detected in the air emission work to date, air criteria relating to these substances have not been set. Table 7 of the CER outlines the contaminants of concern. Section 7.2 of the CER acknowledges that the EPA may request testing for other possible contaminants at the initial stages of the clean-up.

- 3.1.13 How does the proponent justify discussing the implications of 'dilution effects' on airborne contamination when details of the local airshed are unknown?

Response

The air quality of the local airshed has been subject to some monitoring in the past. Background air monitoring has been performed for total dust, heavy metals, acid gases, volatiles, organic compounds and PAH's. Testing upwind of the site has shown low levels of dust, lead and acid gases (hydrochloric, sulphuric and nitric acids). The acid gases were derived from the respective ions in solution and did not represent actual concentrations and are most likely related to salts (CCWA Report 97EH0318).

Dispersion of air emissions will occur on-site due to the processes of atmospheric mixing. This will result in a dilution of airborne contaminant concentrations at the site boundary. The level of dilution will be a function of meteorological conditions, the prevailing wind and the proximity of the site boundary to the working face of the pit. Background monitoring has shown the local airshed to be relatively free of atmospheric contaminants, therefore there is assimilative capacity in the Omex airshed for air emissions generated from the remedial works.

- 3.1.14 Will the proponent consider increasing the number of air monitoring sites to include all site boundaries and sensitive use areas such as the Bellevue State Primary School?

Response

Section 7.2 of the CER commits to monitoring inside the site, on the downwind side of the site boundary and at the primary school. The proponent will consider increasing the air monitoring program to include all site boundaries should this be considered to be justified.

- 3.1.15 Will the proponent consider implementing work restrictions based on the monitoring of meteorological conditions? (ie. stop work at the site and initiate dust suppression measures when wind speeds exceed X knots for a 15 min average, or when dry and windy conditions are predicted by the Weather Bureau)

Response

Work restrictions will apply when the air emissions cannot be safely managed within or below alert/action levels at the site boundary. Remediation activities will be managed using actual air emission data rather than reliance on meteorological information.

- 3.1.16 International standards list suitable benzene exposure levels at between 5 ppb and 10 ppb. Have professional toxicologists reviewed the criteria for selecting 1000 ppb as an appropriate rate for day exposure?

Response

The 1,000 ug/m³ (as distinct from ppb) benzene concentration is for daily exposure and is based on levels previously considered acceptable by both the DEP and HDWA in WA for the temporary scenario associated with remediation of a service station site. The nominated criteria includes any additional benzene emissions related to the adjoining service station. Lower international standards are based on long term exposure. As benzene is a carcinogen where risk is related to cumulative dose over long term exposure, such standards are therefore more stringent.

3.2 ODOURS

- 3.2.1 When considering the issue of odour a clear distinction needs to be made regarding emission levels which are designed to protect public health and those which may provide a nuisance to the community. As we know, 'safe levels' do not necessarily mean nuisance or odour free. Omission of such information may send the wrong message to the community. How will the proponent manage this relationship?

Response

The proponent acknowledges that the community will equate odour as a human health risk and the proponent will endeavour to communicate the fact that this is not the case.

- 3.2.2 Even though monitoring results were below the adopted guideline levels, gas and odour emissions from the BP fuel station remediation operations at Guildford recently caused the evacuation of the Guildford Primary School. It is reasonable to assume that a similar outcome may befall the OMEX project. What plans are in place to handle similar concerns from the community surrounding the OMEX site?

Response

The proponent proposes to consult with the principal of the Bellevue Primary School to ensure that the school is fully informed with regard to the remediation.

The decision to remove children from the Guildford Primary School was voluntary as the remediation did not represent a risk to child health. The Bellevue Primary School is approximately 300 m from the Omex site whereas the Guildford Primary School was less than 100m from the fuel station. The proposed air monitoring program will include the school site.

3.3 SULPHUR DIOXIDE

- 3.3.1 Sulphur dioxide emissions from the OMEX site are expected to be at low levels. However, children of the Bellevue Primary School will be exposed to these gases during travel to and from school and whilst at school. Bearing in mind the susceptibility of children to such irritants and the general disruption it may cause during the school day how will these effects be minimised?

Response

If the criterion for sulphur dioxide is met at the site boundary people will be able to go about their normal business in the surrounding area. The criterion for sulphur dioxide has been derived with sensitive groups such as children in mind.

- 3.3.2 The results of previous and current studies on the OMEX site hold a common view which indicates the presence of sulphur dioxide in the evolved gases. From these studies and an understanding of the chemical characteristics of sulphur compounds we can say:

- sulphur dioxide is known to evolve from the OMEX waste material;
- sulphur dioxide does not have long term stability;
- sulphuric acid does not decompose to form sulphur dioxide;

- high levels of sulphur are present in the waste; and
- the form in which the sulphur occurs (speciated analysis) is not known.

When considering these points the most likely origin of sulphur dioxide is the on-going oxidation of reactive sulphide minerals, similar to the effects commonly experienced in Acid Mine Drainage (AMD). If this is the case, then sulphuric acid could be actively produced at the site and not exist as a residue from original processing, as stated in the CER.

If sulphides are indeed being oxidised within the wastes then the pumping of waters from the waste pits will exacerbate the problem when atmospheric oxygen comes in contact with the presently oxygen deprived sulphides. Similarly, further disturbance of wastes by excavation and stockpiling could also add to this acid generating process.

The studies to-date have not adequately defined the types of sulphides present within the OMEX wastes. It is therefore recommended that further studies are undertaken to define the chemical and physical properties of the sites sulphides. This information will determine if:

- sulphide waste materials release sulphur dioxide on atmospheric exposure;
- sulphuric acid is being produced at the site by the oxidation of reactive sulphides; and
- the proposed remediation program is suitable for the management of sulphur dioxide emissions.

Will the proponent undertake further studies into the characterisation of OMEX site waste based upon the above comments?

Response

Testing undertaken to date on the waste sludge has been for total sulphur and indications are that it is in the form of sulphate rather than sulphide. However the proponent will confirm the form of the sulphur on 'fresh' waste samples as part of a proposed testing program related to air emissions from different depth profiles within the pit.

3.4 GROUNDWATER

- 3.4.1 Concerns have been raised regarding exposure to contaminated groundwater via bore water extraction (i.e. the irrigation of Goodchild Oval). How are the environmental and human health effects of contaminated groundwaters being addressed by the proponent?

Response

The mechanism for preventing exposure to contaminated groundwater is by exclusion where the Water and Rivers Commission (WRC) through current licensing provisions can prevent groundwater use. Once groundwater quality is acceptable for irrigation purposes, this caveat will be lifted. The Goodchild bore will ultimately become affected in approximately 25 years at which time it may be closed should the quality be unsuitable for its current use.

From an environmental perspective, the rate of movement of the groundwater plume and the processes of biodegradation and dispersion will ensure the Helena River is not affected, which is considered to be the primary environmental receptor downgradient of the Omex site.

- 3.4.2 To ensure that the integrity of the 30 m deep subsurface containment wall is maintained ongoing monitoring is recommended. Can the proponent define this monitoring strategy? (please detail your response)

Response

The proposed monitoring strategy for groundwater is outlined in Section 6.5.2 of the CER which would be finalised in consultation with the WRC and EPA. To confirm the integrity of the wall, monitoring will continue immediately outside of the wall for its entire lifespan at a frequency determined in consultation with the WRC and EPA.

- 3.4.3 Due to the concern of local residents regarding contaminated groundwater it is recommended that the proponent commit to a five year post remediation monitoring program of the 15 nearby groundwater bores. Can the proponent detail their response to this?

Response

Response as per 3.4.2.

- 3.4.4 In regards to the proposed dewatering of the site, has the proponent considered, the extraction rates and flow volumes which are required to
- effectively de-water the site;
 - meet the capability of liquid waste transporter's; and
 - meet the on-site liquid storage capabilities.

Should variations to plan produce liquid waste volumes in excess of handling capabilities what emergency responses will be implemented?

Response

The pit contents are expected to exhibit relatively low permeability. Dewatering is achievable but may take some time to complete. The expected liquid recovery rate from the pit is estimated at 30% which equates to some 1,300 m³. On-site storage will be kept to a minimum and the remediation contractor will design the on-site storage facilities with this in mind.

The volume of liquid removed will be in part a function of the approach of the contractor. It will be the responsibility of the contractor to address all of the above matters and have in place contingencies to address larger volumes of liquid. Appropriate contractual provisions will be incorporated in the tender documents.

- 3.4.5 Seasonally perched groundwater is common within the Guildford Formation. Have these features been considered when examining possible contaminant pathways?

Response

Perched groundwater together with all other potentially impacted aquifers have been considered and investigated as appropriate. Perched water accumulates at the surface of the low permeability Guildford Clay soil during and after high rainfall events. It accumulates only within low lying areas of the site and dissipates completely in summer by evapotranspiration. Perched water has not been intercepted near the surface of the major waste pit.

- 3.4.6 It should be noted that several of the water quality guideline values presented within the CER exceed Australian Drinking Water Quality guideline levels (Table 6). Although the Australian, Western Australian and NHMRC/ARMCANZ water

quality guidelines have been referred to in section 3.3.4 it is not clear why certain values have been included in Table 6. Can the proponent explain the criteria used in selecting these values?

Response

The assessment of groundwater contamination is primarily based on protection of the resource as a potential drinking water supply or for recreational contact such as the filling of domestic swimming pools. The WAWQ Guidelines for Raw Water for Drinking Supply have been used as the assessment criteria. These criteria are the same as the 1992 Australian Water Quality Guidelines (ANZECC). Where there are no WAWQ or AWQ Guidelines for TEX volatiles, the NHMRC value for drinking water is applied. For TPH fractions the 1983 Dutch B criteria are used due to the absence of WAWQ/AWQ and NHMRC criteria. Where TPH fractions are not available, the 1994 Dutch Intervention criteria are used (no Dutch B criteria).

With regard to nickel which was identified as the main heavy metal contaminant in the groundwater, the lower NHMRC value was used for modelling purposes rather than the WAWQ/AWQ Guideline. Application of a lower limit for nickel ensures that no potential users ever come into contact with nickel contamination in excess of the WAWQ Guidelines.

- 3.4.7 The hydrogeology and biogeochemistry (interactions between geology, chemical reactions and microbiota) at the OMEX site are complex, this is largely due to the wide range of contaminants and interspersed clays and sands beneath the site. As a result, defining groundwater and contaminant movements is difficult. Has the proponent considered the following points:

- 3.4.7(a) What are the seasonal variations in groundwater conditions within the aquifers beneath the OMEX site?

Do these changes effect groundwater flow directions and vertical head differences?

Have these variation been considered in regard to groundwater modelling, velocity estimates, contaminant movement and the placement of monitoring wells?

Response

Flow directions: the groundwater flow directions in the two aquifers (Guildford Clay: superficial aquifer and the Leederville Formation aquifer) have been clearly determined from numerous groundwater investigations. For the Guildford Clay, flow direction is towards the southwest and does not change seasonally.

For the Leederville formation, flow directions from potentiometric head contours (confined aquifer) have been plotted based on the results from many bores slotted at similar levels in the same part of the aquifer. Flow direction is also in a southwesterly direction with no seasonal variation.

Seasonal variations in water levels: several years of data are available from the GSWA and Golder reports. Vertical head differences are small between the two aquifers, generally a downward head potential exists in winter with the reverse apparent in summer. Vertical head gradients only imply the potential for movement and not actual movement. The presence of horizontal low permeability zones (clay/silt beds) largely prevent any vertical movement of groundwater even if a large vertical hydraulic gradient or head is present.

These variations have been considered in the groundwater fate and transport model.

- 3.4.7(b) The Upper Leederville Formation (ULF) is referred to as being 'confined' (Section 6.2.1) and yet contamination has readily migrated to this zone, this suggests that at best the ULF is semi-confined. Given these results is there enough evidence to suggest that contaminants will not penetrate to the deeper Lower Leederville Formation (LLF)?

Response

Connectivity between aquifers and groundwater contaminant movement:

All the investigations to date show clearly that the leachate movement from the major pit is density driven, and therefore minor hydraulic head differences are insignificant to the flow path taken by the leachate. The density of the contaminated water in the pit is very high compared to that of the adjacent groundwater in both aquifers.

The leachate has very slowly migrated from the base of the pit (about 8 m depth) via a near vertical pathway through interfingering sandy clay and clayey sand beds within the lower part of the Guildford Clay to a depth of about 16 m. Below this depth the leachate then enters a 10 m thick bed of sand in the upper formation of the Leederville aquifer and moves to the base of the sand where it

encounters a solid black marine clay. At this stage the plume of contaminants are diluted further and move by advection (with groundwater flow) in the upper Leederville Formation sand bed or ULF.

The black clay forms an effective base to the shallow flow system, and so forms a continuous barrier to contaminant leakage into the lower Leederville Formation or LLF. All investigations to date show no evidence of leachate movement through the black clay base. It is important to note that the migration of the pit leachate through the lower Guildford Clay clayey strata into the upper Leederville sand bed results in a large reduction in contaminant concentrations observed within the upper Leederville sand bed.

The black clay base has proved to be laterally continuous over the area and there is no evidence of a hydrogeologically significant facies change (change from clay to permeable sand) or the presence of incised channel sands breaching this clay bed. It is considered that there is sufficient direct evidence that contaminants will not penetrate the black clay underlying the ULF and so enter the LLF. Future monitoring of existing bores specifically screened within the LLF will demonstrate this assumption. The future remediation of the site will be confined to the top 10 m of soil within the Guildford Clay and will not encroach into the ULF or interfere with the top of the black clay base at 26 m depth below surface.

- 3.4.7(c) No information was presented on head gradients between the sites underlying aquifers. If head gradients are 'upwards' then contaminant migration downwards would be via fluid density. However, the report defines the site area as a recharge zone (Section 3.3.4) suggesting a positive downward flow. Considering this, is it possible that a higher potential for downwards contaminant migration may exist than that quantified in the CER?

Response

A full explanation of on-site head gradients is provided in the GSWA report which is also noted in response 3.4.7.a. Groundwater dynamics are being driven by fluid density rather than head gradients. The term recharge area used in the CER refers to input from the Guildford Clay into the upper Leederville Formation which occurs over a large local area rather than just specifically to the site. The CER has described the contamination status based on field observations which are the best measure for quantifying contaminant migration.

- 3.4.7(d) Do the contaminants within the groundwater beneath the site reflect those found within the major pit?

Response

Chemical data: The contamination in groundwater in the ULF directly reflects the contamination in the major pit. Processes of natural attenuation in the aquifers, outlined above, has reduced levels of some compounds to below contaminant concern criteria. Nickel was found to be the only metal found in groundwater immediately downgradient at a significant concentration. It was therefore selected for modelling purposes. Elevated sulphur concentrations in groundwater are the best indicator of the presence of the plume, however the sulphur levels in groundwater do not present an environmental or human health risk.

- 3.4.7(e) Given the limited data presented on the characteristics of the LLF are the monitoring wells within this aquifer appropriately located so as to intercept groundwater flow (and associated plumes) from the main pit?

Response

This is explained in response 3.4.7.b.

- 3.4.7(f) Traces of sulphide compounds within the LLF are described in the CER as being related to the pyritic nature of aquifer materials (Section 4.4.2). Considering that oxygen would drive any pyritic oxidation and be important in biodegradation of hydrocarbon compounds have in-situ dissolved oxygen concentrations been recorded?

Response

There is excellent evidence of the oxygen status of the groundwater available from hydrogeological logging of aquifer core samples. The ULF strata are clearly oxidised whereas the LLF strata show no evidence of oxidation of oxygen-sensitive, naturally occurring minerals such as glauconite and pyrite. This clearly shows that oxygen-rich recharge water of the ULF has not impacted the LLF aquifer. Furthermore, the LLF can be considered to be a separate aquifer flow system to that present within the ULF and Guildford Clay.

- 3.4.7(g) Given that variations in borehole configurations and pumps will deliver groundwater of different chemical concentrations from the same polluted aquifer and that low abstraction bores (common within the Perth area) are hard to

police, are restrictions on groundwater abstraction feasible for local residential bores?

Response

Restrictions on groundwater use.

Groundwater investigations have shown that the extent of the groundwater plume is laterally quite small and the impact on Groundwater quality is minor compared to drinking water quality guidelines. The zone of impact offsite is restricted to the upper Leederville Formation - ULF (10 m sand bed) and that the superficial Guildford Clay aquifer has not been impacted offsite at all.

It should be noted that the source of contamination will be removed as part of the remediation and that the worst of the contaminated groundwater in the ULF has been isolated already by the cement/bentonite containment wall. Long term contaminant concentrations in the ULF outside and downgradient of the wall are expected to reduce to insignificant levels through the processes of natural attenuation (as outlined in the groundwater fate and transport model – Appendix C of the CER).

Restrictions on groundwater usage are achievable as the Guildford Clay provides poor yields of unsuitable quality which is unlikely to be developed. Even should a shallow bore be privately installed into the Guildford Clay, the water obtained from the bore would not be contaminated. The ULF does provide a reasonable source but would require a licence and could only be accessed with a drill rig. Therefore the proponent believes that restrictions on groundwater abstraction are feasible for portions of the groundwater that are contaminated.

- 3.4.7(h)** Can the proponent provide audit monitoring of groundwater to show that values used within modelling predictions are reasonable and that contaminants do not migrate in other directions?

Response

The groundwater model incorporated the known hydraulic parameters of the aquifers and the known chemical composition of wastes in the major pit. Audit monitoring of groundwater chemistry outside of the pit shows general agreement between the modelled (time zero) and observed contaminant parameters.

- 3.4.7(i)** What are the post-remediation groundwater monitoring strategies and associated costs?

Response

The post remediation groundwater strategy is outlined in Section 6.5.1 and 6.5.2 of the CER and previously stated in response 3.4.2. The cost to undertake annual monitoring would be expected to be in the order of \$5,000 per event.

- 3.4.7(j) Should soil permeability be high enough, vapour extraction bores located around the perimeter of the pit may limit potential vapour emissions during excavation. Have vapour extraction bores been considered?

Response

Due to both low soil and waste matrix permeability, vapour extraction would be ineffective.

- 3.4.8 What is the expected service life of the bentonite contamination barrier?

Response

The projected lifespan for the bentonite wall is 100 years which is well beyond the time frame for remediating the groundwater. Should the wall develop leaks after this period, the rate of contaminant influx into the aquifer would be insignificant compared to the groundwater flow.

3.5 SURFACE WATER

- 3.5.1 The remediation of contaminated materials from the OMEX site must be managed so as not to create secondary contamination problems. Can the proponent highlight their approach to surface water management?

Response

Surface water management is outlined in Section 7.6 of the CER. The exact details will be determined at the remediation stage and will be controlled through the contract. The remediation contractor will need to address this requirement in their tender submission.

3.6 SOIL

- 3.6.1 The lead results of Cleanaway's trial waste analysis of 5,000 mg/kg differs markedly to the CER (Table 11, page 33) which quotes lead levels of 1,200 mg/kg. Can the proponent explain this variance?

Response

Cleanaway performed a test on the same material from bore OM2 which is detailed in Table 11. The OM2 sample is made up of the full complement of 9 continuous core samples taken over the entire pit depth. On the otherhand, the Cleanaway sample is a composite made up of only 6 of the 9 obtained core samples. As the Cleanaway sample is the same location as OM2 but represents only 2/3 of the pit profile, it was not included in the CER. The Cleanaway results are reasonably consistent with OM2 with the exception of lead which is 4 times higher. However this lead level is within the same order of magnitude and simply represents normal variation seen in samples.

- 3.6.2 Sections 4.3.7 and 4.4.1 state that Minor Pit No. 3 does not contain contaminated waste derived from the OMEX site. Section 6 does not indicate if this pit will be remediated. Will the contamination from this pit be removed at the same time as other works?

Response

Minor Pit No. 3 contains plaster waste and does not require remediation from an environmental or human health perspective.

- 3.6.3 Section 6.4.1 of the CER states that clean-up will take place to a depth of 3.5m, however, Figures 10 and 11 illustrate that depths up to 7.0 m will be excavated. Can the proponent explain these discrepancies and define the correct depth of site clean-up?

Response

The waste contents of the pit which goes to a depth of 7 m will be removed. Contaminated soil surrounding the pit as distinct from the pit contents will be removed to a depth of 3.5 m. There exists the potential for soil contamination to remain below a depth of 3.5 m, however this is expected to be of minor in extent based on recently completed additional environmental investigations on the soil surrounding the pit.

- 3.6.4 How was the depth of excavation (3.5m) determined? Why has it been seen as appropriate to leave approximately 50% of the estimated waste materials in-situ?

Response

The contents of the pit will be fully removed to approximately 7 m, only soil excavation is to be limited to a depth of 3.5m. The depth of 3.5m for soil excavation was chosen based on the outcome of a health risk assessment which concluded no risk to human health below this depth.

- 3.6.5 In regard to the contaminated soil around the main pit that does not require treatment:

- in what manner will the material be stockpiled,
 - how long will it be stored?;
 - will the material be covered? and;
 - where will the stockpiles be located?

Response

The contaminated soil will be stockpiled on a hardstand area of limestone and covered if required (dependent upon the dust generation potential). Stockpiles will be kept damp at all times with the use of sprinklers. The exact location, duration and method of storage will be determined by the remediation contractor. Such details form part of the works program which will need to be approved by the EPA before commencement of the remediation phase (Commitment No.1). Soil stockpiles will be removed as soon as practical following confirmation of the contamination status for disposal approval. The timeframe is dependent upon site activity but is unlikely to be more than a number of days.

An alternative to soil stockpiling is to characterise the soil insitu and excavate directly into the disposal trucks. This method would remove the need for stockpiling but is contingent on acceptance by the landfill operator and the EPA.

- 3.6.6 Given the high oil content, how has it been determined that the waste sludge will remain solid enough for effective excavation, treatment and transport?

Response

A large amount of the free liquid will be recovered prior to excavation. There exists the potential for the solid waste to be excessively wet and unspadable. However this does not mean that the material cannot be excavated. The contractor will choose appropriate machinery to allow effective excavation. To assist in the handling aspect, limestone may be introduced into the waste to aid in its removal and with neutralisation.

- 3.6.7 Will vibrations and movement of the sludge cause liquid to settle from the waste materials? How will this effect the excavation and on-site treatment of the 'solid' wastes?

Response

Separation of liquid may occur during the excavation process due to settlement. The remediation contractor will be required to remove any liquids that form in the pit. This will not affect the excavation process and is considered a management issue.

- 3.6.8 Did initial investigation drilling continue until no contamination was recorded? (Provide log details)

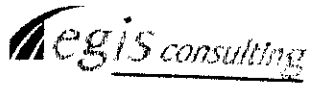
Response

The 1995 GSWA investigation drilled up to a depth of 7.7 m below the pit. The contents of the pit extended to a depth of 7 m where natural sand was encountered. This sand was contaminated but at an order of magnitude less than the sludge waste. Drilling outside of the pit but on the boundary has been completed to depths of 30 m where low level soil contamination was observed within definite layers up to a maximum depth of approximately 24 m. Logs are attached.

- 3.6.9 What has been the fate of contaminated soils removed from the site during the construction of the bentonite containment wall?

Response

The soil removed as part of the containment wall construction was disposed to the appropriate class of landfill after soil and TCLP testing as per the 1996 Landfill Waste Classification and Waste Definitions. Most of the soil was disposed to the



DEPARTMENT OF ENVIRONMENTAL
PROTECTION

Class II landfill at Flynn Drive in Wanneroo with a small amount of Class III material taken to Red Hill.

4. GENERAL ISSUES

4.1 HEALTH AND SAFETY

- 4.1.1 All matters having an effect upon the health and well being of the public should also require HDWA approval. Will the proponent take this opportunity to review remediation strategies with the HDWA?

Response

The proponent through the environmental approval process will seek advice from the HDWA on all matters related to public health arising from the proposed remediation of the Omex site. HDWA will be consulted on all remediation strategies forwarded at the tender stage.

- 4.1.2 Has the proponent developed an education and information strategy to ensure that the community has regular access to relevant information during the remediation project? Has the proponent considered?

- noticeboards showing current air monitoring results?;
- an on site information facility where the public can have their questions answered?; and
- regular community forums?

Response

The proponent will regularly inform the public on the remediation of the site through a newsletter which has been used for the consultation phase. The current hotline will be maintained to field questions and community forums or field days will be held to provide an update on progress and for public input.

An instantaneous sulphur dioxide level for the site boundary will be displayed on a screen outside the site offices for public interest.

- 4.1.3 The description of the toxicology of site contaminants seemed very superficial. Can the proponent provide an outline of symptoms for exposure to the chemicals within the OMEX waste so self assessments can be undertaken?

Response

The primary acute health hazard associated with the Omex waste is from exposure to sulphur dioxide which will not be allowed to reach levels harmful to human health.

Should members of the public believe their health has been compromised from the remediation of the site they should consult immediately with a professional health care worker such as their doctor and/or the HDWA rather than reliance on a self diagnosis checklist.

- 4.1.4 Recent toxicological information suggests that PM 2.5 (particles larger than 2.5 microns) is the more potent contaminant particle size. PM 10, as presented in the CER, is a major concern in regards to nuisance factors such as dust and debris. How has this particle size for the monitoring of particulate contamination been selected by the proponent? (i.e. what is the suspected size of contaminant particles from dried leachate and waste sludge)

Response

The particle size selection of PM₁₀ is based on the criteria nominated in the 1998 National Environmental Protection Measure for Ambient Air Quality. This value includes all particle sizes less than 10 um which includes the PM_{2.5} fraction.

- 4.1.5 The OMEX site is a 40 year old problem. Over this time the local population and surrounding environment have been exposed to varying degrees of contamination emanating from the site. Has the proponent considered the cumulative impact that the proposed remediation may have on human health?

Response

The purpose of the remediation of the Omex site is to remove the potential environmental and human health legacy associated with the contents of the major pit. The issue of potential cumulative impacts relates primarily to workers or long term residents who lived near the pit when it was open to the atmosphere. It is not possible to quantify the exposure of residents to contamination from the Omex Site or other industrial sites in the past due to an absence of monitoring.

The criteria employed to protect public health during the remediation is conservative and is considered acceptable for long term residents.

- 4.1.6 Has the proponent considered conducting 'baseline' medical testing of the nearby residential population?

Response

Yes. However, this is not considered necessary as the criteria employed to protect human health during the remediation is sufficiently conservative. The proposed remediation has been subjected to a health risk assessment and is considered protective of human health and as a consequence baseline medical testing of residents is not considered necessary.

- 4.1.7 In support of an informed and consistent approach to human health issues will the proponent establish a referral service of local medical practitioners who have been briefed on the possible health effects associated with the OMEX remediation project?

Response

The HDWA is fully cognisant with the potential health impacts associated with the Omex waste material. This information will be available to local medical practitioners should they require it.

- 4.1.8 The OH&S Standards used in calculating exposure limits have been designed around 8 hour exposures. Local residents will be exposed for up to 24 hours. Will the proponent reassess the safety levels based on this information?

Response

Table 7 of the CER nominates levels protective of both occupational and public health. The 8 hour value applies to occupational groups only, more stringent daily or 24 hour values are applied for public health (an additional 1 hour value applies for SO₂).

4.2 CONTINGENCY PLANNING & EMERGENCY RESPONSE

- 4.2.1 The community surrounding the OMEX site needs to be made aware of the emergency plan (CER Section 7.9) and any actions which may be required in order to respond effectively. How will the proponent conduct this education?

Response

At the Public Open Days during the community consultation period the proponent (DEP) committed to meet with each resident, immediately adjacent to the site (within 150 to 200 meters of the major pit). These meetings will provide an opportunity to discuss; emergency plans, mechanisms for communication and complaint handling procedures for activities on the site.

- 4.2.2 Can the proponent clarify the emergency 'evacuation' and 'all-clear' criteria as these have not been addressed within the CER?

Response

The proponent (DEP) is a primary response agency under the State's Hazardous Materials Emergency Management Scheme (Westplan Hazmat). In the event of an emergency at the site this scheme will be activated. Any evacuation will be conducted in accord with these arrangements. Health Department of WA are authorised under this scheme to order the evacuation of residents and alternately provide the "all clear".

The proponent commits to providing all relevant information to Fire and Emergency Services in advance of any work

This is consistent with response detailed in 2.1.3

4.3 SECURITY

- 4.3.1 To prevent the public (particularly inquisitive children) coming in contact with contaminants at the site access must be actively restricted. How will the proponent secure the site to ensure public safety.

Response

Once site remediation is underway, public access will be prevented through the provision of secure perimeter fencing and security patrols as outlined in Section 7.9.2 of the CER. Signage will be placed on all site boundaries warning of the site contamination.

4.4 NOISE

- 4.4.1 Studies have shown that children can be easily distracted. What effects will the noise of heavy vehicular traffic have on the concentration of students at the Bellevue Primary School and how will these effects be minimised?

Response

The Bellevue Primary School is currently situated on a main road with traffic volumes of 7,500 VPD. Trucking operations associated with the site remediation will increase this value by 2%. The cumulative impact from vehicle noise is not considered significant.

4.5 CLARIFICATIONS AND OMISSIONS

- 4.5.1 Particular omissions and inconsistencies within the CER have been noted. Can the proponent comment on the following?

- Some materials presented in Section 3.2 were superficial and out of context.
- pH was omitted as a performance indicator for the remediation strategy (Section 1.7 - Table 3) but included as a pH of 8.0 in section 6.3.
- The soil response levels presented in Table 5 omit benzo(a)pyrene and total phenols.

Response

Section 3.2 represents basic information only. Some of the information related to aquatic organisms is not relevant to the Omex site.

For remaining soil, the acceptable pH is between 5 and 9 as outlined in Table 5 of the CER. The pH value of 8 applies to the treated soil wastes destined for landfill disposal.

The total phenol and benzo(a)pyrene levels were inadvertently omitted from the proposed HRA based response level. The values which are to be applied are the Health Based Soil Investigation Levels in Table 5 of the CER which are 1 mg/kg for benzo(a)pyrene and 8,500 mg/kg for total phenols.

- 4.5.2 Will the retaining wall near bowling green C at the Bellevue Returned Services Community & Sporting Club be affected by excavations at the site? If so, what contingencies will the proponent put in place if this wall has to be moved during site remediation?

Response

The remediation contractor will be responsible for maintaining the retaining wall during the excavation process. Should the wall be damaged to access contaminated soil, the contractor will be required to repair any damage back to the original state. Contaminated soil does not extend below the bowling green and will therefore not need to be disturbed during the remediation.

- 4.5.3 Table 7 currently displays a combination of ppm and $\mu\text{g}/\text{m}^3$ units for air emissions. Will the proponent ensure that the standards, alert levels and action levels for air emissions are directly comparable to analytical result?

Response

The units nominated in the CER will be comparable to air monitoring results as well as the standards, alert levels and action levels.

- 4.5.4 Will the remediation of the OMEX site include removal of contaminated soils on lot 136 and lot 130?

Response

Contamination related to Omex waste from Minor Pit No.1 will be removed as part of the site clean-up. Contamination related to non-Omex waste noted in Sections 4.3.7, 4.3.8 and 4.3.9 of the CER will not be addressed as part of the proposed remediation.

- 4.5.5 Considering that the operation of dump trucks and excavators will necessarily uncover substantial portions of the sites wastes can the proponent clearly define the method by which waste material will be excavated from the site to minimise exposure?

Response

The proposed excavation program is outlined in Section 6.3 of the CER. The remediation contractor will be required to manage air emissions to those levels

nominated in Table 7 of the CER. Management techniques are outlined in Section 7.2 of the CER.

- 4.5.6 As with any other project, proposed works do not always go according to plan. In the case of toxic waste remediation this raises a significant level of uncertainty regarding the issues of human health and environmental protection. Who will oversee the activities being undertaken by the proponent to ensure they meet the commitments defined within the CER?

Response

The party undertaking and responsible for the performance of the clean-up is the remediation contractor and the contractor will be required to meet the requirements of the contract which will include measures to protect human health and the environment. The proponent will oversee the remediation program through its environmental supervisor or superintendent and the superintendent will ensure that the contractor conforms to its contractual obligations. An EPA representative will have access to the site and will undertake auditing of the operations.

- 4.5.7 Can the proponent provide the worked matrix used in the selection and rejection of the remediation options presented within the CER?

Response

Selection of the proposed remediation option as been derived from a number of sources including previous work performed on the project and the recommendation of the Contaminated Sites Branch of the DEP. This is all outlined in Section 5.3 of the CER.

Based on the recommendations made in the Golder and DEP reports and following a review of technologies outlined in the CER, the preferred approach which best satisfied the key requirements (Section 5.1 of the CER) of the remediation was the landfill disposal option. Four approaches to excavating the waste were evaluated which is described in detail in Appendix E of the CER.

However, contractors will be able to propose any remediation option on the proviso that it satisfies the standards approved by the EPA and the environmental conditions for the project.

- 4.5.8 The successful implementation of any subjective ranking system requires a high level of professional judgement to reduce the vagaries inherent in this approach.

Was the development of the selection criteria and their relative weighting's conducted by professionals with appropriate experience, expertise and qualifications?

Response

All evaluations pertaining to selection of the preferred remediation option were undertaken by environmental and engineering professionals from government and two recognised consulting firms with extensive experience in contaminated land remediation.

- 4.5.9 Will the proponent remove this waste from the Adelaide Street Landfill in conjunction with the remediation of the OMEX site?

Response

As stated in Commitment 1 and Section 4.2.3 of the CER, the proponent will remove the waste from the Adelaide Street Landfill once the waste can be readily accessed. This may not be performed at the same time as the clean-up of the Omex site.

However the proponent recommends that appropriate checks be placed on the landfill's licence to ensure that the overburden is removed within a reasonable time frame. A notification system will need to be in place to engage the remedial works at the landfill (ie; referral to the EPA).

- 4.5.10 How often will visual inspections by the DEP occur and what criteria have been developed to define the scope of these investigations? How will results be reported?

Response

Visual inspection of the pit remediation will be carried out by the EPA's representative as outlined in Section 6.3.2 of the CER. Such inspections will only be required once the pit contents have been removed. This may occur a number of times during the final stages of the pit remediation. The frequency of these inspections is at the discretion of the EPA.

- 4.5.11 Is the proponent aware that, the Department of Minerals and Energy (DOME) (Chemistry Centre, 1994) recommended that the safest long term solution was the removal of waste oil and contaminated soil to a purpose built secure storage

site? Have the concerns of DOME been considered by the proponent when selecting the preferred remediation strategy?

Response

The GSWA groundwater section of the DOME undertook the first major environmental investigations back in 1995 and had input in the 1997 Golder assessment of remediation options. The proponent concurs with the DOME recommendation of disposing the waste into a purpose built secured storage site. The waste material will be removed from the Omex site and disposed into an engineered landfill at Red Hill which is a purpose built secure storage facility for Class IV waste material.

- 4.5.12 Will road sweeper dust be regularly tested for contaminants and who will view these results?

Response

The dust from the road sweeper will be disposed along with the waste material to landfill. The dust will be tested in conformance with the criteria to be applied to the solid waste material from the pit prior to disposal.

- 4.5.13 Is the development of a hazardous waste treatment plant at the OMEX site within the zoning requirements of the local council? What are the risks to the local community?

Response

The Omex site excluding the Henkin Street properties is currently zoned general industrial. The past oil recycling activities were in conformance with this zoning. It is considered that a temporary mixing facility such as that proposed for the site remediation is consistent with this zoning.

The temporary treatment plant most likely will consist of a mixing trommel. The trommel represents the same level of risk to the community as the excavation operation. Since the contractor will be required to conform to the air quality criteria at the boundary, there will be no risk to the local community.

- 4.5.14 To limit the release of emissions has enclosed remediation been considered? Recent remediation undertaken at the Maylands paint factory site in Whatley Crescent used this method.

Response

The use of an enclosure is a potential management tool for controlling fugitive gas emissions from the pit excavation. The remediation contractor may utilise such an enclosure to meet the specified air quality criteria at the boundary.

- 4.5.15 Liquid waste from the dewatering and leachate collection systems will include hydrocarbon compounds and residues of sulphuric acid, this material may produce fumes, fugitive gases and odours when extracted and treated at the site. How will these issues be addressed by the proponent?

Response

Section 6.3 outlines the management of air emissions from the liquid removal component of the pit remediation. The approach described is to manage air emissions recovery system by keeping the pit a closed environment with little potential for uncontrolled venting to the atmosphere. However, the contractor will be able to use whatever mechanisms they consider appropriate.

- 4.5.16 What have been the results of treatment trials on the waste water from the OMEX site?

Response

The treatment of liquid waste only requires pH adjustment. Such treatment does not require trials.

4.6 INTER-GENERATIONAL EQUITY

- 4.6.1 How does the proponent justify the transfer of 'environmental risk' from one site, (OMEX) to that of another (Redhill and Mount Walton).

Response

Landfill disposal of contaminated material is an approach to managing waste in Western Australia that is accepted by local and state government authorities. The landfill facilities have been designed to provide long term secure storage of waste. In contrast the current site does not provide long term secure storage of the waste.

- 4.6.2 Have the implications of inter-generational equity been applied to the criteria used in selecting the preferred techniques for remediation?

Response

The selection of the preferred technique for remediation was primarily a technical evaluation. However, the selection process worked within the constraints of existing government policy's and laws which consider matters such as long term security of disposal which addresses the issue of intergenerational equality.

4.7 ACID NEUTRALISATION

- 4.7.1 When calcium carbonate (limestone) comes in contact with sulphuric acid the liberated calcium ions react with sulphate ions to produce an insoluble coating of calcium sulphate, inhibiting continued reaction. Considering this, why has limestone been considered a suitable agent for neutralisation.

Response

Limestone has been put forward in the CER as a possible alkali material suitable for neutralising the acidity within the waste. Other alkali materials can be proposed by the successful contractor and the contractor must demonstrate the ability of such material to neutralise the acidity of the waste.

4.7.2 In regard to acid neutralisation has the proponent considered the following points?

- Sodium carbonate (soda ash) reacts well with sulphuric acid but will produce large amounts of carbon dioxide. The resulting effect will be neutralisation and gas purging. This could lead to unacceptable levels of atmospheric emissions.
- Liquid sodium hydroxide also reacts well, however this reaction is highly exothermic. The heat generated during the reaction may cause problems due to elevated volatilisation and subsequent toxic gas generation.
- Powdered limestone and lime does react better with sulphuric acid, however, reactions are still hampered by the production of calcium sulphate. Hence, reaction times are still slow. Also, the use of powdered materials raises the issues of dust generation and management.
- Consideration should also be given to the physical properties of the resulting neutralised materials. Given that the reaction of lime and/or limestone with sulphuric acid produces gypsum, the resulting ameliorated product may set to a solid mass making handling, transport and disposal difficult.
- Further laboratory testing should be carried out on the site materials to determine the best method/s of neutralisation. This research should also consider reaction times so that waste throughput rates from the selected remediation methods can be established.
- Considering the information presented here and the inherent properties of the involved materials the value of two minutes mixing (CER, page. 69) for neutralisation does not appear to have any basis in reality, irrespective of which alkali is used.
- Given the doubt which now exists regarding reaction times the neutralisation step of site remediation should be flagged as a significant risk to the entire OMEX project. Unexpected extensions to the remediation schedule will impact significantly upon the social, environmental and economic costs associated with the proposed works.

Response

The above points are noted and will be taken into account by the proponent. The above issues relating to neutralisation will be brought to the attention of the contractors bidding for the project,

- 4.7.3 Has the use of 'Red Mud' from the Alcoa refinery been considered as a neutralising and binding agent for the sites acidic wastes?

Response

The proponent recognises that such materials could be a potential neutralising agent.

4.8 CORROSION

- 4.8.1 Field equipment coming in contact with the sites contaminated materials will be exposed to highly corrosive conditions. Has the proponent considered:

- equipment may be prone to failure, exhibit reduced safety and have a diminished value at completion of site works;
- the removal of contaminated equipment off site could lead to the exposure of off-site personnel (i.e. mechanics);
- implementing a decontamination system for all off-site movements of equipment and personnel; and
- informing suppliers of goods and services of the sites highly corrosive conditions?

Response

All potential remediation contractors will be advised of the nature and extent of the contamination at the Omex site at the tender stage. This will include all available site history, environmental tests and any trial results.

Decontamination procedures are outlined in Section 7.3 of the CER.

4.9 FUTURE LANDUSE

- 4.9.1 What safe-guards have been installed to ensure that the site will not be used for residential purposes in the future?

Response

The entire Omex site including the pit will be remediated to a standard suitable for residential purposes.

4.10 FIRE MANAGEMENT

- 4.10.1 Considering the flammable nature of the site's waste, what protective measures will be in place when remediation operations commence?

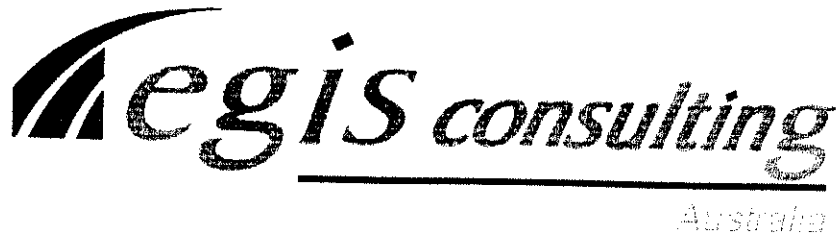
Response

Testing has shown (Section 7.9 of the CER) that the liquid waste is not considered to be flammable, however fire management must be considered in the remediation contractor's occupational health and safety plan.

- 4.10.2 Will continuous flammable gas monitoring be undertaken during remediation (particularly within the confines of the excavations)?

Response

The contents of the pit are not considered flammable as outlined in response 4.10.1. However benzene which is flammable will be continuously tested.



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Report for

OMEX CONSULTATIVE ENVIRONMENTAL REVIEW

Client: **Department of Environmental Protection**
Report: **Omex Response to Submissions**
Date: **10 June 1999**

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1. INTRODUCTION

OMEX CONSULTATIVE ENVIRONMENTAL REVIEW
PROPONENT'S RESPONSE TO ISSUES RAISED
IN PUBLIC SUBMISSIONS

This document forms the principal summary of the public submissions regarding the Rehabilitation of the OMEX Contaminated Site, Bellevue.

A number of submissions were received from government departments including: the Midland District Police Office, Water and Rivers Commission, Main Roads Department, WA Health Department, Shire of Swan and the CSIRO (Centre for Groundwater Studies).

Individual and group submissions were also reviewed from: the Bellevue Returned Services Community & Sporting Club, Bellevue Primary School P&C Association, MPL (Environmental Consultants), The Bellevue Action Group, Avon Clean & Green, The Clean Air Committee, Dingle & Bird (Environmental Consultants) and the OMEX Site Remediation Implementation Consultative Committee.

2. HEADING

1. Contamination Beyond the OMEX Site Boundaries

There is anecdotal evidence that waste material was discharged to adjacent properties, both as liquids and from air emissions. What has the proponent done to ensure that the full extent of contamination from the former operations at the OMEX site has been identified and addressed?

Response

The Omex site including the major and minor pits, and areas off-site have been the subject of a number of environmental investigations as detailed in Table 4 of the CER. A total of 58 sampling locations (excludes off-site) were installed on the Omex site as part of these investigations. In addition, the proponent has recently undertaken a soil sampling program comprising 60 locations to 3.5 m depth on a grid pattern of 20 m X 20 m over all lots which now comprise the Omex site. The grid spacing was reduced to 10 m closer to the major pit. The purpose of this additional testing was to ensure there were no other areas of waste disposal and to confirm the soil status in areas with low potential for soil contamination.

The proponent believes that the Omex site has been assessed sufficiently to characterise the full extent and volume of contaminated waste and soil. A total of 118 sampling locations have been installed to assess a total site area of approximately 20,000 m². This equates to an overall sampling density of 1 per 170 m². The NSW EPA Contaminated Sites Sampling Design Guidelines (1995) specify a minimum sampling density of 1 per 670 m² for the same size site.

2. Presence of Dioxins

2.1 What work has the proponent undertaken to check for the presence of dioxins within the Omex site and within adjacent properties?

Response

The proponent will commit to testing for the dioxin 2,3,7,8 TCDD (Tetrachlorodibenzo-p-dioxin) which is considered to be the most toxic of the dioxin and 16 other priority dioxin-related compounds (i.e. Furans). TCDD is considered to be a USEPA Group A or known human carcinogen.

Testing for dioxin will be undertaken on three samples:

1. waste sludge from the major pit;
2. waste oil from the major pit; and
3. a composite of four near surface soil samples from natural ground around the Omex site.

2.2 In the event of dioxins being at unacceptable levels, what management procedures will the proponent undertake?

Response

Should dioxins be detected they will be managed in the same manner as for other non-volatile contaminants such as PAH's and lead. The primary method of controlling non-volatile contaminant releases is dust control. Section 7.3 of the CER outlines a number of dust management provisions which would prevent the environmental release of dioxin contaminated dust.

Fire is another possible exposure pathway for dioxin release into the atmosphere. Testing has shown (Section 7.9 of the CER) that the liquid waste is not considered to be flammable, however fire management must be considered in the remediation contractor's occupational health and safety plan.