Madsen, Søren R. N.

Fra: Reville, Barry [Barry.Reville@environment.gov.au]
Sendt: 21. september 2009 10:47
Til: Schou, Lone; Madsen, Søren R. N.
Cc: Hall, Damien; Jakobsen, Dorte Skjøtt; Hermansen, Dorte; Rothenfluh, Daniel
Emne: RE: GPCR Process [SEC=UNCLASSIFIED]
Vedhæftede filer: SIA Response to Mr Bridle 090421.pdf; 090423 trb letter to SIA.DOCX

Dear Lone

Please find attached the relevant letters. Last week, on 18 September 2009 when providing us with these letters, SIA told us that "We have not had any further response from Mr Bridle or any other parties associated with the GPCR technology to this date."

I hope that this is helpful. Please let me know if there is anything else you need.

Best regards

Barry

Dr Barry Reville
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From: Schou, Lone [mailto:LOS@MST.DK]
Sent: Friday, 18 September 2009 12:45 AM
To: Reville, Barry; Madsen, Søren R. N.
Cc: Hall, Damien; Jakobsen, Dorte Skjøtt; Hermansen, Dorte
Subject: SV: GPCR Process [SEC=UNCLASSIFIED]

Dear Barry and Damien,

In the proces of getting all papers in place I realise that I cannot find the letter from SIA to Mr. Bridle (the respond to his letter of February 26 which you mentioned in your mail of April 7) - It might be that I have neglected this letter, but could you please send me a copy of it. I have from your mail of March 11 the answers to Mr. Bridle, but not the final letter which was send to him.

Second in your mail of April 7 you mention that SIA has invited mr. Bridle for a discussion and at the time of the mail it was not clear if he had accepted this invitation - 1) Did he accept it afterwards and 2)has he send in any comments to the answers send by SIA on his questions/conserns raised in his letter of February 26 ?

best regards
Lone

Fra: Reville, Barry [mailto:Barry.Reville@environment.gov.au]
Sendt: 7. april 2009 10:22
Til: Schou, Lone; Madsen, Søren R. N.
Cc: Hall, Damien; Jakobsen, Dorte Skjøtt
Emne: GPCR Process [SEC=UNCLASSIFIED]

Dear Lone
Thank you for your recent email regarding your ongoing assessment of the Department's Duly Reasoned Request (DRR) and Orica's export applications.

As you are getting closer to finalising your assessment, I thought it would be appropriate to provide you with the current status of Mr Trevor Bridle's concerns regarding the SIA report in relation to the GPCR process.

In response to the Department's letter of 27 March 2009, Mr Bridle has made contact with the Department and with SIA.
In responding, Mr Bridle says that he did not receive the SIA letter of 11 June 2008. Further contact between Mr Bridle and SIA suggests that SIA had an out of date address for Mr Bridle.

SIA has provided Mr Bridle with a copy of the original letter and invited him to discuss his concerns with SIA. At this stage, it is not clear whether Mr Bridle will accept SIA's invitation.

SIA also is writing to Mr Bridle addressing each of the concerns he has expressed in his letter to our Minister. We will provide a copy of the SIA letter to you as soon as it is available.

In the meantime, and notwithstanding Mr Bridle's criticisms, SIA has confirmed to us that the SIA report is correct in concluding that the GPCR process cannot deal with the Orica HCB waste within a reasonable time frame.

Please let us know if you need additional information.
Best regards
Barry

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21 April, 2009

Dear Mr. Bridle,

Once again we appreciate your comments and feedback on the Independent Assessment Report and also the work you have undertaken to provide information regarding the GPCR technology in relation to this assessment.

The Independent Assessment Report undertaken for the Commonwealth Department of Environment, Water, Heritage and Arts (DEWHA) by Sustainable Infrastructure Australia (SIA) was a tailored report with a specific scope to assess the treatment of the Orica Hexachlorobenzene (HCB) stockpile (approximately 60,000 drums) using "available technologies operating in Australia". It was in no way a critique on technologies or an assessment of capability for treatment of any waste streams other than the significant Orica HCB stockpile. This is stated clearly in the report. GPCR was initially outside of this scope of the study however was included in the Independent Assessment Report as we believed it was a well proven technology that had been recently operating in Australia and that warranted further investigation considering its success in treating many waste streams at the former Kwinana, WA facility.

You must be aware that as there is no longer an operating facility in Australia, there have been limitations in terms of recent or factual operating data to draw upon for this assessment and we have had to use a variety of information sources including the Western Australian EPA.

As the report focuses on Australia's capacity, we attempted to contact all relevant organisations and individuals in Australia. The information we obtained, included the results of the trials that were previously conducted on samples from the Orica HCB stockpile, in Kwinana, back in 1999, as well as the assessment report on this trial, produced by Kvaerner. In addition, we also sourced information from both ELI Eco Logic and Orica on the results of this trial, as well as additional information from the Western Australia Environment Protection Agency. As a result, we were confident we had sufficient data to make a robust assessment.

We are aware that there have been clear differences of opinion in terms of the interpretation of the outcomes of the trial and as referenced in Section 4.4.6 of our report clearly states that "*Eco Logic questioned the accuracy of these results*". We understand the concerns you have raised, however, as this is a an Independent Assessment Report evaluating technical capacity to treat the

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Orica HCB stockpile it would not be appropriate for SIA to cut and paste preferred statements from any technology provider verbatim as suggested, for inclusion in our assessment.

Referring specifically to actions you have requested of SIA in your email dated 15th April 2009 I give the following responses:

Requested Action [A]

You requested to: *"Revamp Section 4.4.3 of your report to reflect that the GPCR process has been used to treat mainly high-strength wastes and NOT low-strength wastes as reported. (see Comment 1 of my letter to Minister Garrett.*

Response:
Our Report, section 4.4.3, states -
*"Eco Logic facilities to date have processed waste streams with **low to medium** hydrocarbon and organo-chlorine contamination levels, such as contaminated soils, and this is the continuing projected market for the technology. The Orica HCB waste stockpile has highly concentrated high chlorine content and is a high organics (hydrocarbon) content material."*

By way of further comment - by1999 when the WA ELI facility was operational most of the larger power transformers in Australia had already been flushed at least once, for maintenance, and PCB levels had generally been reduced below 200ppm. The Araklor blend originally used in transformers was usually around 10% by weight trichlorbenzene, making these fluids about 6% by weight chlorine.

By comparison the Orica HCB waste contains up to 75% chlorine and we therefore submit that the waste streams treated at Kwinana could be called "low to medium strength" with respect to their chlorine content.

Requested Action [B]

You Requested:
Rewrite Section 4.4.4 to correct the false statements that the GPCR process was not successful in treating HCB waste. Excerpts from the ELI Ecologic Report and the Kvaerner report are shown below. In the conclusions of the ELI report the following statement is made. "Results of the trials indicated that the system can effectively desorb approximately 98 percent of the waste input to the TRBP. In excess of 99.9999 percent of the HCB and chlorobenzene, and 99.9 percent of the PCDD/Fs, present in the waste were volatilised in the

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TRBP and swept to the reactor for destruction. Destruction efficiency measurements indicated at least 99.9999 percent destruction of HCB and total chlorobenzenes. The results of the testing showed that hexachlorobenzene (HCB) can be effectively destroyed in a Gas Phase Chemical Reduction (GPCR) process". It is clear from this statement that the process was effective in desorbing essentially all of the HCB and other CPs in the TRBP and then destroying them in the reactor. In the conclusions of the Kvaerner report (Appendix A of the ELI report), the following statement is made. "Based upon on-site and off-site chemical analyses, the Eco Logic process safely and effectively destroys HCB wastes, leaving a residue resembling charcoal or coke that appears to weigh at most a few percent of the initial weight of HCB wastes. This confirms thermodynamic equilibria modelling of the chemical reduction reactions of HCB and related compounds by Kvaerner, as well as laboratory experiments by Orica and Eco Logic". I strongly recommend that these excerpts are used verbatim in section 4.4.4 of your report.

Response:
I believe you are referring to section 4.4.5 Process Capability to Treat HCB. This section states *"The technology is not suitable in its present state for treating HCB waste, primarily due to the wide range of melting and boiling points of the compounds present in the waste. With further development, however, the technology could no doubt be suited to the destruction of the HCB waste."* In both instances you are requesting insertion of commentary from the ELI Ecologic report.

Our statement is correct, on the understanding that our report is particularly pertaining to the Orica HCB waste stream. The question of further development is raised by ELI and Kvaerner, with respect to several critical issues, such as:

- Increasing the scrubber stages to accommodate the high chlorine content of the Orica waste stream,
- Management of scrubber residues and contaminated filter media,
- Further development of the GPCR process to reduce by-product formation such as the tars that blocked the scrubbers and filters during the trials,
- Or development of scrubber systems designed to manage these tar deposits, and disposal or recycle procedures for these residues,
- Contaminant level of the solid residue from TRBP, requiring a further destruction process for this product (around 600 tonnes), plus a management procedure for the contaminated scrap steel from the drums (more than 2500 tonnes),

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- Development of the vaporization step in the process, and/or management of the still contaminated residues from the TRBP process.

The indications were that Orica would need to assist with the development of a second generation process specifically to address the difficulties encountered in the trials. The very hazardous nature of this waste stream would surely suggest that technology development to such a degree would be uncertain with respect to outcome, timing and cost.

Action [C]

To respond to all points raised in your letter to Minister Garret I provide the following details:

1. In section 4.4.3 of the report, SIA state that the GPCR process treated primarily "low concentration" OC wastes. This is not true; most of the WA wastes treated were pure DDT and high-strength PCB wastes. In fact, during its operational life, the GPCR facility in Kwinana treated much of Eastern Australia's high-strength Scheduled Wastes, after obtaining WA DEP approval to do so.

Response:

See response to your first request outlined above [A]

2. In section 4.4.4 of the SIA report it is stated that the commercial HCB trial was not successful in that the process left an organic residue. This is not true as the residue from the process was the inorganics present in the mixed HCB waste. In all the HCB trials the GPCR process achieved in excess of 99.9999% destruction of HCB, and the inorganic residue from the process met regulatory requirements for landfill disposal. In this section SIA again say, incorrectly, that GPCR was used to treat predominately low strength wastes.

Response:

The reference you have used seems to be incorrect and misleading as Section 4.4.4 of our report states "Trials with Orica's HCB waste stockpile were disappointing and not all of the Chlorinated Hydrocarbons (CHC's) were volatilized. The residual material in the drums had transformed during the soaking process into a hard, not volatile char-like substance that would require a further treatment step."

The stated 98% volatilized and 'acceptable for landfill disposal' were not adequate for the Orica waste.

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Our report states that the process as it stands at present is not adequate and has been applied to wastes with low to medium chlorinated organics levels.

3. In section 4.4.5 of the report, SIA do not state that the one high dioxin emission result occurred when, at the request of Orica, the processing rate exceeded the capacity of the scrubber to remove the HCl generated by the process. It was the presence of this HCl, which when combusted, that generated the dioxins. It appears that this GPCR information was obtained from Orica, with no independent attempt by SIA to verify these Orica statements, for example, with input from Dr Doug Hallett. Extensive independent testing and analysis has confirmed that dioxin emissions from the GPCR process are **well** below international standards.

   Response:

   We are happy to review any credible data that you can provide on the stated extensive independent testing and analysis that provides details on dioxin emissions. As stated at the start of this reply we are not questioning or evaluating the capability of the GPCR technology to treat organo-chlorine wastes, other than the Orica HCB stockpile. We are convinced that the technology as it stands cannot adequately treat the particular Orica waste stream, and that the degree of development required, and the lack of anything like a suitably sized facility anywhere in the world, precludes this technology from consideration.

4. In section 4.4.6 of the SIA report it is stated that the residues from the GPCR process, when processing Orica's HCB waste, contained more than 2 mg HCB/kg. I believe this is NOT correct but have been unable to source the reference material from Orica to confirm where this value comes from.

   Response:

   Thermal desorption has been stated to achieve 98% reduction in mass of original sample, and to have volatilized 99.9999% of HCB and other CBs. Taking this to mean that 0.0001% ends up in 2%, the contaminant level thus works out at 50ppm of HCB and CBs in the thermal desorption residue.

   The scrubbers are there to remove dioxins and such, as well as the very large amount of HCl produced in the afterburner. With such high hydrogen-chloride content the re-formation (de Novo synthesis) of dioxins and furans during quench cooling for scrubbing will be considerable and these compounds will end up in any liquid or solid residues arising from scrubbing. I would expect them to be far in excess of 2ppm.

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The only reason this is not also the case for incineration of these wastes is that the incinerators have very large capacity and the wastes are blended with other lower chlorine content wastes, prior to or within the incineration process.

As stated previously the SIA Independent Assessment Report was strictly prepared to evaluate capacity of existing technologies operating in Australia to treat the Orica HCB stockpile. It is not an evaluation of any technology to treat other waste streams or even smaller volumes/quantities of HCB. We understand the concern that technology owners or licensees may have in relation to an independent critique of their technology. Unless you are able to provide further validated data or detailed information that can be provided to warrant further consideration of the evaluation we stand behind the original findings of the report.

As suggested to you in previous correspondence provided on the 9th of April 2009 we will remove your name from the stakeholder list to modify the report. Our intent as always has been to incorporate any valid information and feedback you are able to provide on the GPCR technology and I believe SIA have made efforts to do this through initial phone contact and the transcript being send forward. It is unfortunate that your previous address was used however this was an oversight and not in any way an intention to preclude you from access to information regarding the GPCR assessment.

I hope this resolves the issues that have been raised in relation to the SIA Independent Assessment and we hope that statements referencing "misleading" or "Inaccurate" information can be substantiated by relevant information if raised in future. Please feel free to contact me if there is any further response that you require.

With Regards

Stephen Thompson

Director

23 April 2009

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Dear Steve

Subject: GPCR and the SIA Independent Assessment Report

Thank you for your letter dated 21st April in reply to my email of 15th April, regarding the SIA assessment of the GPCR process to treat the Orica HCB waste stream. Based on our numerous exchanges on this issue, I believe there are irreconcilable differences between Bridle Consulting and SIA regarding the SIA assessment of the GPCR process. Based on the summaries and conclusions in the ELI and Kvaerner reports (on the destruction of the Orica HCB waste), I fail to understand how SIA reached its view of the GPCR process as detailed in your Assessment Report.

You mention that the GPCR process should NOT be included in the report since the DEHWA contract scope said that only technologies currently operating in Australia were to be assessed. It may thus be best if all reference to the GPCR process is deleted from your report.

There is one fact in your report that is, without dispute, incorrect. This is your statement in Section 4.4.3 of the report that the Kwinana GPCR plant treated mostly low strength waste, such as contaminated soil. If you were to check the log of material treated by the facility you would see that most of the material was high-strength WA Scheduled Waste, including pure DDT, stock-piled the WA Dept of Agriculture and pure askarel fluids, stock-piled by Western Power. These wastes contained up to 50% by weight of chlorine, not that different to the Orica HCB waste stream. In fact, one of the draw-backs of the GPCR process is that it cannot economically treat low strength wastes due to the excessive hydrogen consumption for such wastes. This is the main reason for closure of the Kwinana plant, once Australia's high-strength Scheduled Wastes had been destroyed.

The statement in your letter of 21st April that the residue from the processing of HCB waste would have a HCB/CP content in excess of 50 mg/kg is also incorrect. The data reported in the ELI report shows the measured levels for HCB ranged from 3 to 5.6 mg/kg.

I understand that Dr Doug Hallett and/or his solicitors will be contacting you directly regarding the commercial damage that your report, if published in its current draft format, will have on the technology.

Finally, I wish to inform you that I will use all professional opportunities presented to me to publicly dispute the SIA assessment of the GPCR process for the destruction of HCB wastes.

Sincerely,

Trevor Bridle
Principal Consultant

cc. D Wright, DEWHA