# APPLICATION FOR EXEMPTION FROM THE REQUIREMENTS OF SCOPING AND EIA AND AUTHORISATION FOR AN INCINERATOR IN THE PBMR FUEL PLANT (PFP)

# SUBMISSION TO AUTHORITIES


| | |
|---|---|
| Prepared by: | SE Solutions (Pty) Ltd<br>PO Box 100339<br>Moreleta Plaza<br>0167 |
| Author: | Sean O'Beirne |
| Date: | 25 May 2009 |
| Revision: | First submission to authorities |

**TABLE OF CONTENTS**


1. INTRODUCTION ..... 5
2. THE INCINERATOR ..... 6
   2.1 Need ..... 6
   2.2 The incineration process ..... 6
3. MOTIVATION FOR EXEMPTION FROM THE FULL EIA PROCESS ..... 9
   3.1 Overview ..... 9
      3.1.1 Incineration as a listed activity ..... 10
   3.2 Why is incineration preferable to evaporation? ..... 10
   3.3 Typical public and authority concerns regarding incinerators ..... 12
      3.3.1 Transport and safe handling ..... 12
      3.3.2 Operator safety ..... 13
      3.3.3 Atmospheric emissions ..... 13
      3.3.4 Dioxins and furans ..... 13
      3.3.5 Bottom ash ..... 13
      3.3.6 Cooling water effluent ..... 13
      3.3.7 Negative human health effects ..... 14
      3.3.8 Negative sentiment ..... 14
   3.4 Concluding comments ..... 15
4. THE PUBLIC CONSULTATION PROCESS ..... 17
   4.1 Registering Interested and Affected Parties (I&APs) ..... 17
   4.2 Availability of documents ..... 17
   4.3 Stakeholder comments ..... 18
5. SUMMARY AND CONCLUSIONS ..... 21


**LIST OF FIGURES**


**Figure 1: Schematic process flow diagram of the incineration component of the effluent treatment plant** ..... 7

**Figure 2: Schematic presentation of the configuration of the incinerator showing the different components of the scrubbing process as well as the dimensions of the incinerator. Note the width of this page (A4) is 21 cm so the actual incinerator is narrower than the page.** ..... 8

**Figure 3: Schematic presentation of the incinerator and associated emissions control showing the progressive reduction in uranium in the off gas. It should be noted that the quantities shown are in grams *per annum*.** ..... 20


**LIST OF TABLES**


**Table 1: Annual waste stream composition and throughput to incinerator** ..... 6

**Table 2: The characteristics of the effluent stream from the PFP for which incineration has been proposed as a means of uranium recovery and waste disposal together with the percentage composition of the individual components.** ..... 9

**Table 3: Incinerator emissions released to atmosphere.** ..... 11

**Table 4: Comparison of the make-up of the effluent stream with no treatment, treatment by evaporation and treatment by incineration.** ..... 16

## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| APPA | Atmospheric Pollution Prevention Act |
| $CO_2$ | Carbon dioxide |
| DEAT | Department of Environmental Affairs and Tourism |
| EIA | Environmental Impact Assessment |
| GNR 386 | Government Notice No. R. 386 of 2006 of the NEMA EIA Regulations |
| GNR 387 | Government Notice No. R. 387 of 2006 of the NEMA EIA Regulations |
| HEPA | High Efficiency Particulate Abatement |
| I&APs | Interested and Affected Parties |
| IPA | Iso propanol alcohol |
| kPa | Kilopascal |
| LPG | Liquid Petroleum Gas |
| MeOH | Methanol |
| Necsa | South African Nuclear Energy Corporation |
| NEMA | National Environmental Management Act |
| NEMAAQA | National Environmental Management Act: Air Quality Act |
| $NH_4NO_3$ | Ammonium nitrate |
| $NH_4OH$ | Ammonium hydroxide |
| PBMR | Pebble Bed Modular Reactor |
| PFP | PBMR Fuel Plant |
| ROD | Record of Decision |
| THFA | Tetrahydrofurfuryl alcohol |
| U | Uranium |
| $U_3O_8$ | Uranium oxide |

**PREFACE**

The document submitted here is based on a document that was placed in the public domain for review and comment. That document has been updated in response to those comments and is the document presented here. In addition the document placed in the public domain has been separated into two different documents one that addresses the incinerator exemption (this document) and one that addresses the proposed amendments (APPLICATION FOR AMENDMENT OF THE AUTHORIZATION (ROD) ISSUED FOR THE PBMR FUEL PLANT (PFP) SUBMISSION TO AUTHORITIES). Details of the applications and the process that has been used in their preparation are provided in the respective reports.

## 1. INTRODUCTION

As part of an overall process to establish a Pebble Bed Modular Reactor (PBMR) project in South Africa, application was made to *inter alia* the Department of Environmental Affairs and Tourism (DEAT) for the establishment of a fuel manufacturing plant (called the PBMR Fuel Plant or 'PFP') at the South African Nuclear Energy Corporation (Necsa) Pelindaba facility. The function of the PFP is to manufacture the uranium containing fuel spheres (pebbles) that are required for operation of the PBMR reactor. As part of the application an Environmental Impact Assessment (EIA) was completed during 2001 and 2002 and the PFP was subsequently authorised by the Minister of Environmental Affairs and Tourism in January 2007.

In the intervening period several changes have been proposed to the design of the PFP. Such changes are fairly typical of an evolving design process and occur in response to various drivers including technical and commercial success, safety and environmental performance requirements. The changes proposed for the PFP are:

- Changes to the configuration and footprint of the plant including the establishment of an outdoor chemical storage area (it was previously proposed to store chemicals required for the process in an existing building);
- A change in the annual rate of use of uranium that will be processed at the plant;
- Changes in process flow descriptions including the introduction of a small-scale incinerator;
- Changes in the materials and quantities of materials that are required for the industrial process; and,
- Changes in the wastes and/or changes in the waste quantities.

These proposed changes have been presented to the Minister of Environmental Affairs and Tourism (hereafter 'the Minister') who responded by indicating that an amendment process must be followed as required in Chapter 4 of the NEMA EIA Regulations. A separate application has been submitted for that amendment (APPLICATION FOR AMENDMENT OF THE AUTHORIZATION (ROD) ISSUED FOR THE PBMR FUEL PLANT (PFP) - SUBMISSION TO AUTHORITIES). At the same time the proposed introduction of the incinerator requires a new application to be lodged for that specific activity. Given the small scale of the incinerator this document serves as application for exemption from certain process requirements of the regulations and for authorisation of the activity on the basis of the assessment that has been presented here.

## 2. THE INCINERATOR

### 2.1 Need

Within the effluent treatment component of the PFP, there is a need to separate residual organic liquid from the suspended uranium in solution, and also to dispose of used / spent methanol. At an early stage in the original EIA, it was planned to use an incinerator for this function, but public concerns saw this changed during the EIA process to an evaporator. However, further refinements in design have shown that incineration is a more efficient and effective means of addressing this requirement than evaporation. At the outset it must be recognised that the incinerator is small. A maximum of 212 kg per week1 would need to be disposed of through the incinerator together with 161 kg per week1 of LPG which is the fuel for the incinerator. This is a small volume, when compared to industrial scale incinerators, and could be considered as no more than a (equivalent) laboratory scale incinerator.

### 2.2 The incineration process

The incineration occurs in the effluent processing component of the PFP and is illustrated as a schematic process flow diagram in Figure 1. The process is one of combining the filtrate from a number of ultra filters, mixing that with waste methanol to increase the calorific value, and then combusting the mixture in the incinerator. The off gases are quenched and scrubbed to remove any entrained uranium, and this uranium is then extracted in an ion exchange process and recycled. The remaining off gases are passed through HEPA filters before being emitted to atmosphere via the stack. The anticipated throughput to the incinerator is summarised in Table 1. Final feed quantities are still being refined, and it is probable that the quantities of waste methanol added will be reduced. The incinerator configuration and size is illustrated schematically in Figure 2.

**Table 1: Annual waste stream composition and throughput to incinerator**

| Material | | Mass (kg/annum) |
|---|---|---|
| THFA | Tetrahydofurfuryl alcohol | 1 036.00 |
| IPA | Iso propyl alcohol | 348.00 |
| $NH_4NO_3$ | Ammonium nitrate | 1 617.00 |
| $NH_4OH$ | Ammonium hydroxide | 43.00 |
| $H_2O$ | Water | 4 599.00 |
| U | Uranium | 0.23 |
| MeOH | Methanol | 1 891.00 |
| Solids | | 3.00 |
| **TOTAL** | | **9 537.00** |

** An additional 7 260 kg/a of LPG are used in the incinerator as fuel for igniting flame.*

[1] This figure is based on 45 working weeks a year.

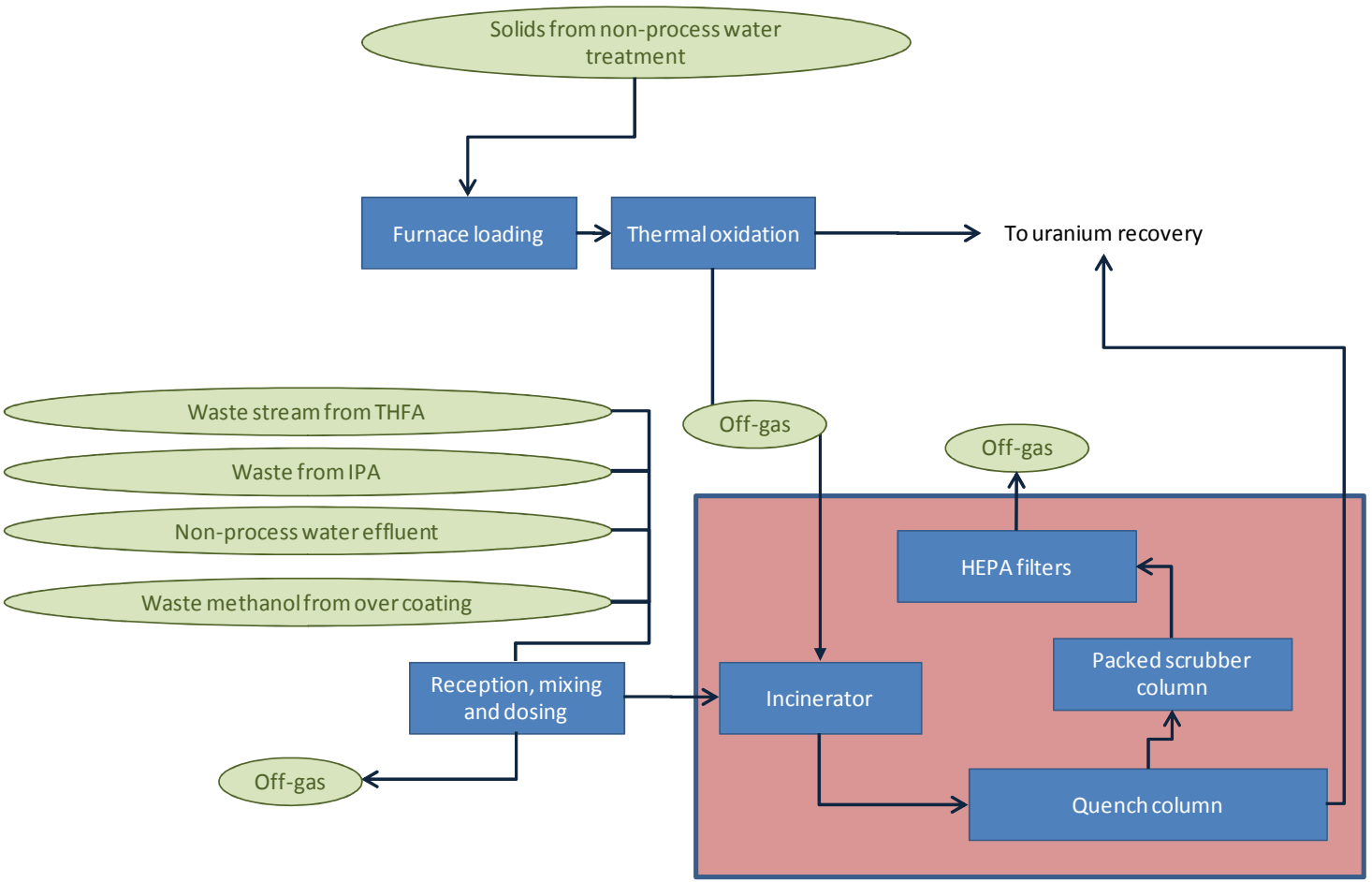


**Figure 1: Schematic process flow diagram of the incineration component of the effluent treatment plant.**

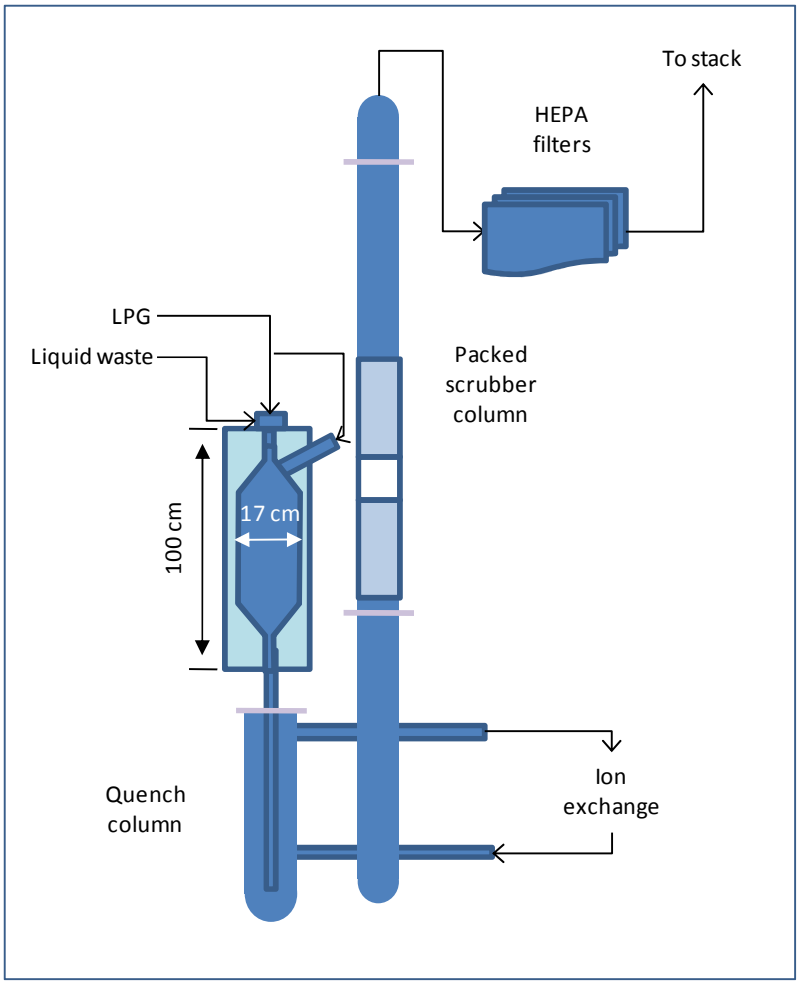


**Figure 2:** **Schematic presentation of the configuration of the incinerator showing the different components of the scrubbing process as well as the dimensions of the incinerator. Note the width of this page (A4) is 21 cm so the actual incinerator is narrower than the page.**

## 3. MOTIVATION FOR EXEMPTION FROM THE FULL EIA PROCESS

### 3.1 Overview

During the effluent treatment process a waste organic stream is produced that contains small quantities of uranium. These effluent characteristics are summarised in Table 2. The requirement is to recover the uranium while safely disposing of the waste stream at the same time. In the original EIA it was proposed to use an evaporation process to achieve this requirement but it is now planned to rather use an incinerator as the incinerator will be more efficient and effective in meeting the above requirements.

The incinerator will be used to thermally separate residual organic liquid from the suspended uranium in solution, and to dispose of used / spent methanol. The filtrate from a number of ultra filters will be combined, mixed with waste methanol (to increase the calorific value), and then combusted in the incinerator. The off gases from the incinerator will be quenched and scrubbed to remove any entrained uranium, and the uranium will then be extracted in the ion exchange and recycled. The remaining off gases will pass through HEPA filters before being emitted to atmosphere via the stack.

Treatment of all process effluents is required to ensure maximum recovery of uranic materials. The proposed use of incineration was mooted during the EIA process but then not included in the final EIA. As such incineration was not authorised and the proposed use of an incinerator requires a new application for authorisation as per the NEMA EIA regulations.

**Table 2: The characteristics of the effluent stream from the PFP for which incineration has been proposed as a means of uranium recovery and waste disposal together with the percentage composition of the individual components.**

| Material | | Mass (kg/annum) | Comp (%) |
|---|---|---|---|
| THFA | Tetrahydofurfuryl alcohol | 1 036.00 | 10.87 |
| IPA | Iso propyl alcohol | 348.00 | 3.65 |
| $NH_4NO_3$ | Ammonium nitrate | 1 617.00 | 16.96 |
| $NH_4OH$ | Ammonium hydroxide | 43.00 | <0.5 |
| $H_2O$ | Water | 4 599.00 | 48.23 |
| U | Uranium | 0.23 | <0.003 |
| MeOH | Methanol | 1 891.00 | 19.84 |
| Solids | | 3.00 | <0.1 |
| **TOTAL** | | **9 537.00** | **100.00** |

### *3.1.1 Incineration as a listed activity*

Incineration is listed twice in the Schedule of Activities included in the NEMA EIA Regulations in both GNR 386 and GNR 387. The following activities are listed in GNR 387:

*(1) The construction of facilities or infrastructure, including associated structures or infrastructure, for:*

*(e) any process or activity which requires a permit or license in terms of legislation governing the generation or release of emissions, pollution, effluent or waste and which is not identified in Government Notice No. R. 386 of 2006.*

*(q) the incineration, burning, evaporation, thermal treatment, roasting or heat sterilisation of waste or effluent, including the cremation of human or animal tissue;*

The NEMA EIA regulations therefore dictate that a full scoping and EIA process must be completed prior to authorisation being granted. Given the small scale of the proposed incinerator, the previous authorisation for evaporation and the requirement to dispose of a well-defined effluent stream, it is considered that a full EIA is too onerous a requirement for the application.

Accordingly, application for exemption from the following procedural requirements from the Scoping and EIA will is being made:

i) Further public participation (to that described in paragraph 4) save to the extent which may be determined by the Minister
ii) The compilation of a Scoping Report [Regulations 28(e) – (f), 29, 30 and 31]
iii) The compilation of a comprehensive Environmental Impact Report in terms of regulation 32, save for any additional information which may be required by the Minister in terms of regulation 32(q).
iv) Specialist reports and reports on specialised processes [Regulation 33]

## 3.2 Why is incineration preferable to evaporation?

The currently authorised evaporation process uses two alternative types of pump configuration to extract the vapour from the evaporator. The first process configuration is a water ring pump, which operates at some 40 kPa (absolute). The pump extracts the water vapour and volatiles which vaporise at the same or lower temperature than the water and the water vapour then condense in the pump. The difficulty with the use of the evaporation process is that the volatiles (isopropanol, methanol and ammonia) will also be condensed with the water therefore simply increasing the concentration of these compounds in the effluent.

The second evaporation process configuration is to use a normal pump together with steam. The steam supply on the Necsa site is normally delivered at 600 kPa, which translates into a steam temperature of 155 degrees Celsius (operational temperature). Whereas the

organic wastes remain in the effluent stream with the water ring pump, using steam will mean that $NH_3$, IPA and methanol will also be vaporized with the water. In other words the wastes would be converted into their gas phase and released to atmosphere. This is obviously not an ideal circumstance.

The benefit of incineration is that the organic wastes are destroyed (broken down into their individual chemical elements and combined with oxygen thereby neutralising their potential toxicity). The incinerator off gases will be routed to a quench and a packed scrubber column where the uranium will be scrubbed and then routed to the ion exchange unit for further recovery. The incinerator will be fuelled by LPG and excess oxygen will be fed into the process to ensure complete combustion. The reaction temperatures in the incinerator will be maintained above 1 300 degrees Celsius to ensure thermal decomposition of the wastes. The following chemical reactions will take place in the incinerator.

$$C_5H_{10}O + 7\,O_2 \rightarrow 5CO_2 + 5H_2O \quad \text{\_\_\_\_\_1}$$

$$C_3H_8O + 5O_2 \rightarrow 3CO_2 + 4\,H_2O \quad \text{\_\_\_\_\_2}$$

$$2NH_4NO_3 \rightarrow 2N_2 + 4H_2O + O_2 \quad \text{\_\_\_\_\_3}$$

$$NH_3 + O_2 \rightarrow N_2 + H_2O \quad \text{\_\_\_\_\_4}$$

The uranium present is converted to $U_3O_8$ in the incineration process. The $U_3O_8$ is then dissolved in the scrubber medium which is acidic. The solution is then treated in the ion exchange column to extract the uranium and returned to uranium recovery for reuse. The characteristics of the gas stream once the incinerator off-gases have passed through the water scrubber and HEPA filters are shown in Table 3.

**Table 3: Incinerator emissions released to atmosphere.**

| Material | Mass (kg/annum) | Mass (%) |
|---|---|---|
| $CO_2$ | 3 590.00 | 9.2 |
| $O_2$ | 2 988.00 | 7.6 |
| $N_2$ | 29 677.00 | 75.8 |
| $H_2O$ | 2 911.00 | 7.4 |
| $U_3O_8$ | <0. 00015[1] | Negligible |
| **TOTAL** | 39 166.00 | 100 |

[1] *The emissions of $U_3O_8$ from the incinerator will be < 0.15 grams **per annum**.*

This means that the most significant gaseous release would be $CO_2$ which would be produced at some 3.6 tonnes per annum. This is broadly equivalent to the $CO_2$ emissions from a typical motor vehicle that would travel about 35 000 kms in a year. The relative

changes in the effluent stream are summarised in Table 4. It can be seen from the table that incineration offers a number of advantages over evaporation in reducing the potential release of waste to the environment.

During the consultation process described in Chapter 4, the motive for previously including an evaporator was questioned. The comment went on to suggest that there may have been false information provided previously. In response, it should be noted that the evaporation approach will not provide for effective disposal of the organics in the waste stream in terms of the evaporator on its own. In other words the use of the evaporator would suffice in terms of the uranium recovery role, but the waste organic stream would require further treatment prior to disposal. The fact that evaporation would not result in the effective disposal of the organic stream does not mean that the organic stream would not have been treated. Evaporation still remains a viable (and authorised) option for uranium recovery and the fact that an incinerator is now being proposed as a better way should not be taken to mean that evaporation is not an acceptable way.

## 3.3 Typical public and authority concerns regarding incinerators

The following concerns are typically associated with incineration:

- The transport and safe handling of the waste to be incinerated;
- Operator safety;
- Atmospheric emissions especially where there is a variable waste stream being incinerated;
- The formation of dioxins and furans during the combustion process due to the presence of chlorine or other halogens in the waste stream;
- Bottom ash from the incinerated material which can contain hazardous materials and thus requires further disposal;
- Cooling water effluent which may become contaminated by hazardous materials;
- Potentially negative human health impacts as a result of the environmental aspects of the incinerator;
- Strongly negative sentiment amongst interested and affected parties that results in opposition to the operations on an incinerator.

In respect of the above, the incinerator proposed for the PFP is highly unlikely to result in significant negative impacts as is detailed below.

### *3.3.1 Transport and safe handling*

The waste stream that will be incinerated requires no transport and is contained within the industrial process. In addition it is important to note the scale of the waste stream which is small. Some 9.5 tonnes of waste will be processed per annum nearly half of which will be water. A maximum quantity of 212 kg of waste per week would need to be incinerated which would require some 161 kg of LPG fuel in the same period. It should be noted that

the draft listed activities for the *National Environmental Management Act: Air Quality Act* (NEMAAQA) regulations (Table 2 part 2.2.6, listed activity 8.1) include a threshold of 10 kg of waste processed per hour or more (240 kg per day). The listed activities are equivalent to the previously defined *scheduled processes* under the old Atmospheric Pollution Prevention Act (APPA). In other words the proposed PFP incinerator would not require an emissions certificate under the proposed NEMAAQA regulations which serves to highlight again the small scale of the incinerator and the waste stream that will be incinerated.

### *3.3.2 Operator safety*

The waste stream is fed directly to the incinerator without the need for direct handling by an operator. The waste stream is hazardous due to the presence of trace quantities of uranium and the composition of the waste stream and for that reason there will be no direct exposure to the waste stream by any operators.

### *3.3.3 Atmospheric emissions*

Atmospheric emissions from the incinerator have been described earlier and are summarised in Table 4 below. As has been described the atmospheric emissions are limited to carbon dioxide, water, nitrogen and oxygen. The $CO_2$ emissions in any given year will be no more than those produced by an average motor vehicle.

### *3.3.4 Dioxins and furans*

Given the fact that there are no halogens in the waste stream it is highly unlikely that dioxins and furans would form in the combustion process.

### *3.3.5 Bottom ash*

There will be no bottom ash produced by the incinerator. The entire waste stream will be converted to non-hazardous gases apart from the uranium which will be captured in the scrubber column and recycled.

### *3.3.6 Cooling water effluent*

The incinerator off gases will be routed to a quench and a packed scrubber column, where the uranium will be scrubbed and the effluent then routed to the ion exchange unit for further recovery. The hazardous organic materials contained in the effluent would have remained using evaporation but these will be destroyed in the incinerator process. Thus there will no discharges of waste cooling water.

### *3.3.7 Negative human health effects*

On the basis of the atmospheric emissions from the incinerator proposed for the PFP, namely water, nitrogen and carbon dioxide, the risk of adverse human health effects is deemed to be negligible. The uranium in the waste stream is obviously hazardous but the probability of exposure is very low due to the multiple containment described earlier and the high efficiency recovery of the uranium by the scrubber column and HEPA filters. As was described the *emissions* of $U_3O_8$ will be less than 0.15 grams per annum which is no more than a small trace quantity.

Emissions from the incinerator will be directed to the main stack where there will be a measurement of the combined uranium emissions from the entire fuel plant. A study has been performed whereby the worst case scenario for potential release from the whole plant was analysed without any HEPA filters in place. From the study it was shown that the highest dose a member of the public would be exposed to is <8 μSv/y. This figure is some 3% of the regulatory requirements and the HEPA filters reduce this very small figure even further. The contribution of the incinerator is only a very small portion of the total uranium emission from the PFP so human health risks are negligible.

### *3.3.8 Negative sentiment*

There is no doubt that the incinerator has been perceived negatively by stakeholders and there are multiple comments decrying the use of the incinerator and insisting that a full EIA be conducted. Against this opposition must be weighed up the effectiveness of incineration in disposing of the waste stream and recovering the uranium that is contained in that stream. The previously proposed (and currently authorised) evaporation approach will not provide an as effective disposal of the organic stream. On this basis the incinerator is deemed to be an environmentally preferable means of treating the waste stream.

It is interesting also in dealing with the issue of negative sentiment to see the comments that have been submitted. While some comments have been factually based and directly related to the specific characteristics of the incinerator, others have significantly exaggerated the risks without any factual support for the claims. For example comments received have implied that 'spent fuel' will be processed in the incinerator when nothing of the sort will happen.

Claims have also been made that 'incinerators are all damaging to the health of surrounding populations and in the case of the incinerator proposed for the PFP will impact on the populations of Johannesburg & Pretoria and even further afield'. No factual evidence was supplied as to this threat other than the claim, and the assessment offered earlier has shown that human health risks are negligible even in close proximity to the stack from which emissions will be released, certainly not in any way off the Pelindaba site and no possible risk to 'Johannesburg , Pretoria and even further afield'.

The question that has to be asked is whether a full EIA, that resulted in the same findings that have been presented here would go any further in appeasing negative sentiment about the incinerator that is held by certain participating stakeholders. Negative sentiment amongst certain stakeholders about a proposal such as the incineration of an organic waste stream with trace quantities of uranium present is highly unlikely to change regardless of the information that is presented on the performance of the incinerator, atmospheric emissions and threats or lack thereof to human health. Opposition to an activity is not in its own right an adequate reason for a negative decision.

### 3.4 Concluding comments

It is clear that for larger scale incinerators with variable waste streams and operating conditions there are many potential risks to the environment that need to be comprehensively assessed in a scoping and EIA process. In this motivation the key risks typically associated with incinerator operations have been identified and for each it has been shown that for the incinerator proposed for the PFP, the risks are very low or negligible. It is generally accepted that impact significance can be defined in a manner similar to risk and that is multiplying the intensity of the impact (i.e. the consequence) by the probability that the impact will manifest. The intensity of the impact is defined in turn in terms whether the impact is cumulative, the nature of the impact, the extent and duration, the degree to which the impact can be reversed, and the degree to which the impact may cause irreplaceable loss of resources (Regulation 32 (2) k of GN 385).

So while the waste stream to be incinerated on the PFP is hazardous with potentially high *intensity* of impact the *probability* of formation and/or release of hazardous materials to the environment is deemed to be very low or negligible. For example, in the event of a loss of cooling water or temperature falling below the required combustion temperature the incinerator would automatically stop the waste stream feed until the required operating parameters are regained. This implies that even a more detailed assessment than that presented here would be highly unlikely to indentify more significant impacts than those detailed above or to conclude that the potential impacts that have been identified would be more significant than what has been presented here.

**Table 4: Comparison of the make-up of the effluent stream with no treatment, treatment by evaporation and treatment by incineration.**

| | NO TREATMENT | | | EVAPORATION | | INCINERATION | | |
|---|---|---|---|---|---|---|---|---|
| Aqueous Phase | **Material** | **Mass (kg)** | **Mass Comp(%)** | **Mass (kg)** | **Mass Comp (%)** | No aqueous release | | |
| | **THFA** | 1036 | 10.87 | 1037 | 0.3 | | | |
| | **IPA** | 348 | 3.65 | 0.00 | 0.00 | | | |
| | **$NH_4NO_3$** | 1617 | 16.96 | 1617 | 0.46 | | | |
| | **$NH_4OH$** | 43 | 0.44 | 0.00 | 0.00 | | | |
| | **$H_2O$** | 4599 | 48.23 | 828 | 0.24 | | | |
| | **U** | 0.23 | 0 | 0.23 | 0.00 | | | |
| | **Methanol** | 1891 | 19.84 | | | | | |
| | **Total** | 9 537 | | 3 481 | | | | |
| Gas Phase | | No gas release | | **Mass (kg)** | | | **Mass (kg)** | **Mass Comp (%)** |
| | **THFA** | | | 0 | | **$CO_2$** | 3590 | 9.17 |
| | **IPA** | | | 348 | | **$H_2O$** | 2911 | 7.43 |
| | **$NH_4NO_3$** | | | 0 | | **$N_2$** | 29677 | 75.77 |
| | **$NH_4OH$** | | | 0 | | **$O_2$** | 2988 | 7.63 |
| | **$H_2O$** | | | 3 792 | | | | |
| | **U** | | | 0 | | | <0.00015 | Negligible |
| | **Methanol** | | | 1891 | | | | |
| | **$NH_3$** | | | 21 | | | | |

## 4. THE PUBLIC CONSULTATION PROCESS

The public consultation process used for the amendment application has also been used to present the proposed application for exemption. The consultation process has been essentially one of placing this documentation in the public domain for a period of 30 days (extended by two weeks) and inviting review of and comments on the same. That process has been supplemented by the holding of an open house at the Necsa facility at Pelindaba during which opportunity was presented for interested and affected parties to interact directly with members of the project team and EIA teams to ask questions and/or solicit additional information. All comments received have been considered and have been used to ensure that concerns are adequately addressed and that sufficient information is provided for decision-making.

The broad components of the public consultation process are detailed below together with indicative timing:

- Registering of interested and affected parties (I&APs) – January 2009;
- Placing of notices advertising the processes and detailing opportunities for participation – January 2009;
- Placing of newspaper advertisements on the processes and detailing opportunities for participation – January 2009;
- Placing of documentation in the public domain for a 30 day comment period – 16 February 2009 to 18 March 2009 (closing date) – note this was subsequently extended to 1 April 2009;
- Holding an open-house during which time additional clarification could be obtained on the applications, questions answered and issues lodged – 4 March 2009 at Necsa;
- Finalising of documentation on the basis of comments received –late March 2009; and,
- Submission of applications to the authorities – now May 2009.

### 4.1 Registering Interested and Affected Parties (I&APs)

Interested and affected parties (I&APs) were identified from the list of I&APs who participated in the original EIA. This list has been supplemented with I&APs who have participated in the most recent environmental assessment activities conducted on behalf of Necsa. I&APs have been requested to formally register for involvement in this process to ensure the correct contact details and properly record both their involvement in the process as well as the issues raised. The main application will be available in English but summaries will be available in Afrikaans and Northern Sotho as well.

### 4.2 Availability of documents

Documents for review were made available from 16 February 2009 and at the following venues:

- Gate 2 (Pelindaba)

- Hartebeestpoort library
- Atteridgeville library
- Brits library

The documents were also posted on the following internet site (www.sesolutions.co.za) and electronic copies sent by email where so requested.

### 4.3 Stakeholder comments

Comments received from stakeholders on the proposed exemption application can be summarised as follows:

- Will there be changes in throughput on the PFP that would place additional load on the incinerator?;
- The efficiency of HEPA filters in restricting emissions;
- How the scrubbing process works;
- The risk of dioxin and furan formation;
- That incineration does not reduce radioactivity or destroy metal;
- The capacity of the incinerator;
- Threats to human health and other hazards and the extent of the distribution of emissions;
- The location of the incinerator;
- The need for the incinerator
- Reliability and track record of incinerators;
- Dimensions of the incinerator;
- Why was the incinerator not considered at the time of the EIA?;
- What additional insurances are required for the incinerator?;
- Cumulative effects of emissions;
- What waste will be fed to the incinerator – is it spent fuel?;
- What are the budget implications of the incinerator;
- Details regarding the chemical reactions that take place in the incinerator;
- Which stack will be used?;
- Is the application retrospective?;
- The scale of the incinerator cannot be used as justification for exemption especially in light of nuclear related issues;
- Does exemption provide a precedent for other incinerators?;
- A full EIA is required; and,
- Comprehensiveness of public participation i.e whether advertising, choice of language, public meetings, community outreach, time period for comment, style of writing and so forth was adequate.

Each of the specific questions asked in respect of the incinerator has been responded to and these questions and the responses are captured in the appended Issues-Response Report. However, the following can be stated as a general response to the questions raised by

stakeholders. Firstly, a number of the questions asked had already been answered in what was presented in the document that went into the public domain. For example, the capacity of the incinerator, why it was considered a better approach than evaporation, the chemical reactions that take place and so forth. In these terms the questions do not raise any new issues and at most require some additional explanation. Secondly some of the comments received included issues that have been misunderstood. For example, the incinerator is proposed for the recovery of the uranium in an effluent stream that occurs within the process.

The incinerator will not be used to dispose of any other wastes that are generated during the industrial process, nor will 'spent fuel' be processed in the incinerator as stated in some of the comments received. Comments were made on the hazard properties of the effluent that will be destroyed by the incinerator which are agreed with, but that is precisely why they are being incinerated. Thirdly comments received questioned the trustworthiness of the emissions from the incinerator presented in the exemption application but no other possible emissions were proposed other than dioxins and furans which have already been dealt with. There are no halogens in the waste stream that could result in dioxin and furan formation and the chemical reactions have been detailed to highlight that the resultant products of the combustion process are water, carbon dioxide and nitrogen.

The questioning of the efficiency of the HEPA filters by one stakeholder resulted in a revisiting of the emissions from the incinerator. The concern raised in terms of the HEPA filters related to a less than optimum performance that was reported on in an article submitted by the stakeholder. Having reviewed the article it seems that the HEPA problems reported were for very specific applications and that these problems will not manifest on the PFP. However, the question raised the further issue of whether or not there were any emissions of uranium from the incinerator (it had been previously indicated that these were 0). Given that the efficiency of HEPA filters is 99.97% and not 100% there must be some release of uranium. This was then calculated to be less than 0.15 grams per annum which is a negligible amount and why 0 was indicated previously (see Figure 3).

Very importantly no new issues have been raised that require additional formal assessment. From this point of view it would appear to be of little value to subject the incinerator to a full scoping and EIA process, when the likely decision-making issues have already been addressed. Stakeholders also complained about the size of the incinerator being inadequate as a motivation for exemption. Size alone is probably not adequate to justify the exemption but when seen together with other important criteria like the consistency of the waste stream and the emission characteristics then the potential risks to the environment are negligible. While size cannot be the only criteria, it is important criteria nonetheless. As has been presented in this report, the volume of waste that will be processed by the incinerator is less than the minimum threshold currently being proposed in the NEMAQA legislation for invoking the need for an emissions certificate. In these terms it is difficult to see why a full EIA would be needed other than to respond to the negative stigma associated with

incinerators that may be held by certain stakeholders.

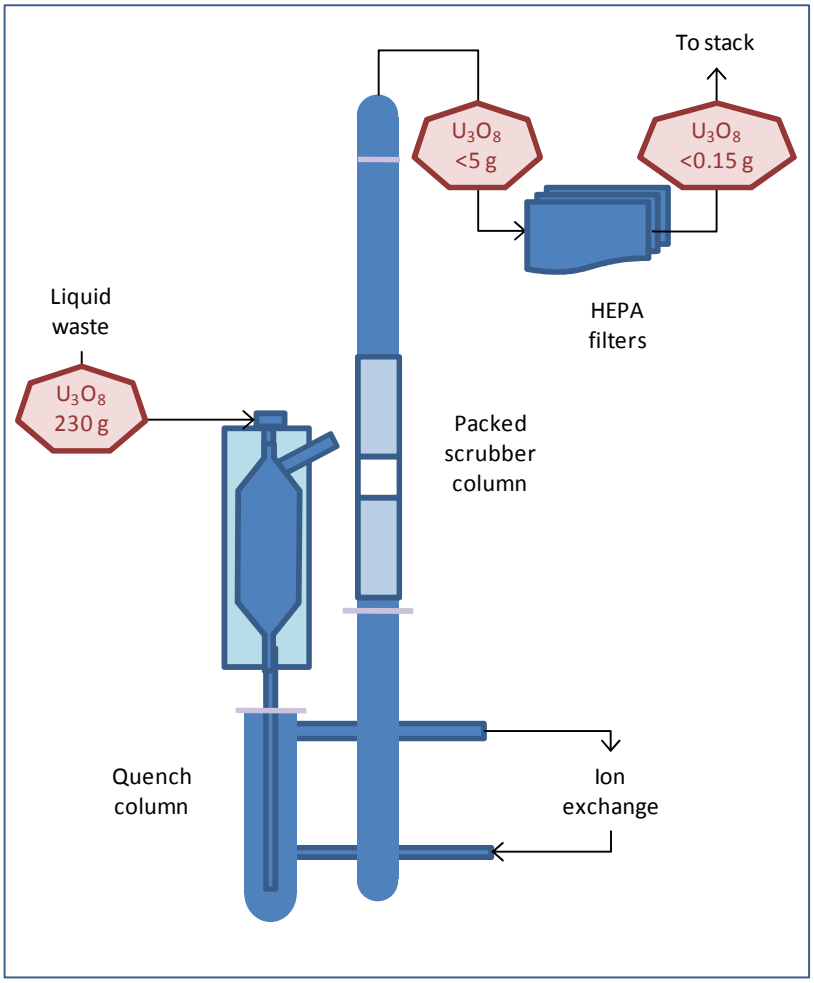


**Figure 3: Schematic presentation of the incinerator and associated emissions control showing the progressive reduction in uranium in the off gas. It should be noted that the quantities shown are in grams *per annum*.**

## 5. SUMMARY AND CONCLUSIONS

A series of proposed design changes since the issuing of the RoD for the PBMR Fuel Plant (PFP) has resulted in the need to apply for amendments to that RoD. However, one of the proposed design changes is to use an incinerator rather the approved evaporation process for the destruction of organic waste stream and recovering of the uranium contained in that stream. Because incineration was not applied for in the original EIA it is necessary to submit a new application for the incinerator as all forms of incineration are listed in the NEMA regulations as activities that require a scoping and EIA on which a decision can be made on whether or not to authorise that activity.

The argument that has been presented in this document is that the requirement to conduct a full EIA on a municipal waste, medical waste or other incinerator which process large and variable waste streams is understandable but appears to be a needlessly onerous requirement for the incinerator that is being proposed for the PFP. The incinerator is small scale, processes no more than 4 kg an hour of a constant waste stream and has been proposed as an improved way of dealing with the organic waste stream compared to the evaporation process that is already approved.

Atmospheric emissions from the incinerator are well defined and are limited to water, carbon dioxide, nitrogen and traces of uranium. The uranium quantities emitted to atmosphere will be less than 0.15 grams per year which is a negligible amount. No aqueous waste or bottom ash is produced and because the incinerator is an integrated component of the industrial process, the hazards associated with waste handling are significantly less than for a variable waste stream.

The one significant complexity is stakeholder opposition to the incinerator but even here, despite that opposition, no issues have been raised in the consultation process that would require additional investigations into the potential environmental impacts of the incinerator. On this basis it is argued that a full EIA would add little additional information on the potential environmental impacts of the incinerator, and nothing more that would have decision-making significance on whether or not to authorise the incinerator. For these various reasons it is requested that the incinerator be exempted from the requirements of a full EIA and that authorisation be granted for this activity.