DS-005-0179 – Sellafield Effluent Strategy Modelling Discharge Projections in support of the Sellafield Ltd Radioactive Substances Activity Environmental Permit Application Site Limit Proposals

Date: 09/10/18

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1. Introduction

Sellafield Ltd has undertaken a major site review of the Environmental Permits leading to an application to vary the Radioactive Substances Activity (RSA) Environmental Permit. Environment Agency (EA) will consider the application (involving public consultation) which will make proposals for permit variation in two phases, firstly following the end of Thorp reprocessing shearing and secondly following the end of Magnox reprocessing de-canning[1].

A key aim of the review is to establish a more flexible and proportionate Permit which will better facilitate timely responses to changing Sellafield Ltd strategies and uncertainties associated with discharge profiles.

Limits will be set following a three step process:

1. Sellafield Ltd assess discharges associated with future site activities supported by an assessment of Best Available Techniques (BAT) to control discharges and taking into consideration future uncertainties;

2. Sellafield Ltd propose limits, or revisions to existing limits, based on the discharges estimated in step (1);

3. EA assess Sellafield Ltd's proposals and set limits and levels as appropriate.

This report provides a summary of the future discharge outcomes that supports points 1 and 2 in underpinning the basis behind the proposed changes to permit limits. The changes considered as part of the review are:

- Removal of site limits where discharges have fallen below significant levels, in terms of quantity discharged and resulting impact

- Reductions in site limits where discharge expectations allow

- Removal of plant limits and replacement with lower notification levels which will ensure closer monitoring of discharges and timely notification to EA of increasing trends but will also enable Sellafield Ltd to optimise discharge routing and the effective use of abatement plants

- Changes to limits implemented in two phases (end of Thorp shearing and end of Magnox decanning) via a single permit application and consultation process

[1] Following the end of Thorp shearing and Magnox decanning, effluents associated with reprocessing operations will continue to be treated beyond these dates through downstream processes & facilities prior to final discharge.

- Introduction of a 2 tier site limit structure to make it easier to manage permit limits in future. It is anticipated that this change will mean site limits could be increased from lower to upper tier within weeks – providing an acceptable BAT justification is made – rather than the current position where Article 37 opinion (Ref 1) and public consultations can each take several months. Notably most of the proposed upper tier limits are well below current limits and in only one case these are the same.

Future Sellafield Ltd permitted limits must take into account the potential variability in radioactive discharges during historic/legacy activities. i.e. it is important to ensure the application of BAT to minimise the environmental impact of discharges whilst not unnecessarily constraining the future site high hazard/ risk reduction programme, delays to which would almost always be certain to result in increased overall environmental impact (in the long term).

2. Overview of Sellafield effluent management

Liquid and gaseous radioactive and non-radioactive effluents are generated during operational and decommissioning activities at the Sellafield site. The Sellafield Effluent Management Strategy (SEMS) outlines current and future requirements and recommendations for managing such effluents. The strategy is a critical enabler and must be delivered to ensure the successful delivery of spent fuels and special nuclear materials management, site decommissioning and remediation on the Sellafield site.

As reprocessing nears completion, the emphasis at Sellafield is shifting to environmental remediation, decommissioning and clean-up of the historical legacy with an increasing degree of uncertainty. The Overall Effluent Strategy Model (OESM) at Sellafield has been developed to predict current and future discharges from the Sellafield site. This model deals with a complex and varying set of interacting source terms, and is of increasing importance in forward predictions and identifying associated BAT arrangements. There is continual improvement in source data and forward predictions, whilst acknowledging the need for flexibility during periods of future uncertainty. Better understanding of these uncertainties relating to future discharges is an ongoing aspect of preparation for the retrieval and associated treatment plant capabilities. This is reflected in the OESM predicting to within 20% for well understood flowsheets with predictable performance parameters, confirmed by comparison with historic discharge data, to greater uncertainty due to the unique and shifting challenge.

Future effluent predictions are managed by the SEMS team and effectively governed by the Sellafield flowsheet working party.

3. Sellafield effluent key uncertainties

The SEMS uncertainty management process has been utilised to help inform the permit review. SEMS uncertainty management is an on-going process aimed at increasing confidence, transparency, visibility and management of flowsheet

uncertainties and expected outcomes. It allows Sellafield Ltd to understand predictions of future discharges which underpin reports, such as the Compilation of Environmental Agency Requirements Issue 14, Requirement 4.2.2 annual report, and inform reviews, such as this major permit review.

The process involves identification and consideration of key variables or uncertainties which are either performance, schedule or challenge related, all of which could impact the effluent strategy and forward discharge projections. The likelihood and consequence of the uncertainties have been assessed, on the basis of current knowledge, via a suite of models such as the SIXEP Activity Management Project (SAMP) and the OESM. Key uncertainties are summarised in Table 3 and Table 4, in Section 6.

A pragmatic approach is utilised to understand the potential impact of uncertainties that have been identified but have not yet been assessed to identify impact on discharges. This utilises historic data from non-reprocessing related activities (taking note that discharges related to reprocessing are not reflective of future Sellafield Ltd operations) along with the key species that carry the most uncertainties.

It is important to note that all discharges presented and analysed in the review are based on the best available knowledge and assumptions at the time of writing and therefore are subject to variability.

The governance and assurance arrangements for uncertainty management outcomes are linked into the relevant Sellafield Ltd technical and strategic forums.

Further assurance for the process has been provided by independent members of the strategic and process engineering community within Sellafield Ltd. The process has been shared externally to stakeholders such as the EA, Office for Nuclear Regulation and Nuclear Decommissioning Agency with positive feedback.

The uncertainty assessment has been used to inform the two tiered Phase 2, upper and lower limit proposals, for both liquid (aqueous) and gaseous (aerial) effluents.

4. Conclusions

It is important to note that all discharges presented and analysed in the review are based on the best available knowledge and assumptions at the time of writing and therefore are subject to variability.

The proposed site limits are considered fit for purpose for the future – and are not expected to constrain site high hazard and risk reduction activities. This includes removal of limits where they no longer add value.

The proposed site limits are considered to demonstrate substantial reductions in discharges without compromising business risk.

Table 1 & Table 2 summarise the output from the analysis carried out by SEMS team which was supported through the OESM, SAMP, EAGLE and the SEMS uncertainty management work.

5. Results

5.1 SEMS discharge projections to support proposed site liquid discharge limits

The table below summarises the results from the uncertainty assessment, details the proposed limits and should be viewed in-conjunction with the discharge graphs in section 5, whist acknowledging the uncertainties in section 6.

Table 1 – Summary of current & proposed Phase 1 and Phase 2 site liquid limits

	Current Site Liquid Limit (GBq)	Phase 1		Phase 2							
		Phase 1 - Proposed Site Liquid Limit (Post THORP Reprocessing) (GBq)	% Drop vs current limit	Phase 2 - Proposed Site Liquid Limit Upper (Post MAGNOX Reprocessing) (GBq)	Upper Limit % Drop vs current limit	Phase 2 – Projected Discharges including Higher Uncertainty (GBq)	Projected Discharges including Higher Uncertainty % Drop vs current limit	Phase 2 - Proposed Site Liquid Limit Lower (Post MAGNOX Reprocessing) (GBq)	Lower Limit % Drop vs current limit	Phase 2 – Projected Discharges including Lower Uncertainty (GBq)	Projected Discharges including Lower Uncertainty % Drop vs current limit
Tritium H-3	1.80E+07	1.08E+07	**40%**	7.20E+06	**60%**	1.80E+06	**90%**	1.44E+06	**92%**	9.00E+05	**95%**
Carbon-14	2.10E+04	1.79E+04	**15%**	1.05E+04	**50%**	1.05E+04	**50%**	8.40E+03	**60%**	5.25E+03	**75%**
Cobalt-60[I]	3.60E+03	3.60E+03	**0%**	3.60E+03	**0%**	3.60E+03	**0%**	3.60E+03	**0%**	3.60E+03	**0%**
Strontium-90	4.50E+04	3.60E+04	**20%**	3.15E+04	**30%**	3.15E+04	**30%**	2.25E+04	**50%**	1.57E+04	**65%**
Zirconium-95 & Niobium-95 in total	*2.80E+03*	*Remove*		*Remove*		*Remove*		*Remove*		*Remove*	
Technetium-99	1.00E+04	9.00E+03	**10%**	8.00E+03	**20%**	6.99E+03	**30%**	6.00E+03	**40%**	3.99E+03	**60%**
Ruthenium-106	5.10E+04	3.57E+04	**30%**	1.53E+04	**70%**	5.13E+03	**90%**	1.02E+04	**80%**	2.78E+03	**95%**
Iodine-129	2.00E+03	1.60E+03	**20%**	8.00E+02	**60%**	3.99E+02	**80%**	4.00E+02	**80%**	3.04E+02	**85%**
Caesium-134	*1.60E+03*	*Remove*		*Remove*		*Remove*		*Remove*		*Remove*	
Caesium-137	3.40E+04	2.72E+04	**20%**	2.38E+04	**30%**	2.38E+04	**30%**	1.70E+04	**50%**	1.54E+04	**55%**
Cerium-144	*4.00E+03*	*Remove*		*Remove*		*Remove*		*Remove*		*Remove*	
Neptunium-237	*7.30E+02*	*Remove*		*Remove*		*Remove*		*Remove*		*Remove*	
Plutonium-Alpha	7.00E+02	7.00E+02	**0%**	6.30E+02	**10%**	5.63E+02	**20%**	4.20E+02	**40%**	3.53E+02	**50%**
Plutonium-241	2.50E+04	2.00E+04	**20%**	1.75E+04	**30%**	1.01E+04	**60%**	7.50E+03	**70%**	3.75E+03	**85%**
Americium-241	3.00E+02	2.70E+02	**10%**	2.40E+02	**20%**	1.96E+02	**35%**	1.50E+02	**50%**	1.51E+02	**50%**
Curium-243+244	*5.00E+01*	*Remove*		*Remove*		*Remove*		*Remove*		*Remove*	
Alpha-emitting radionuclides	9.00E+02	8.10E+02	**10%**	7.20E+02	**20%**	7.24E+02	**20%**	4.50E+02	**50%**	4.53E+02	**50%**
Beta-emitting radionuclides	1.80E+05	1.44E+05	**20%**	1.26E+05	**30%**	1.25E+05	**30%**	8.10E+04	**55%**	8.09E+04	**55%**

[I] Co-60 upper & lower uncertainty levels taken to be at current site liquid limit

The following charts below (Figure 1 – Figure 14) represent the supporting information for species which are being proposed for site limit reduction.

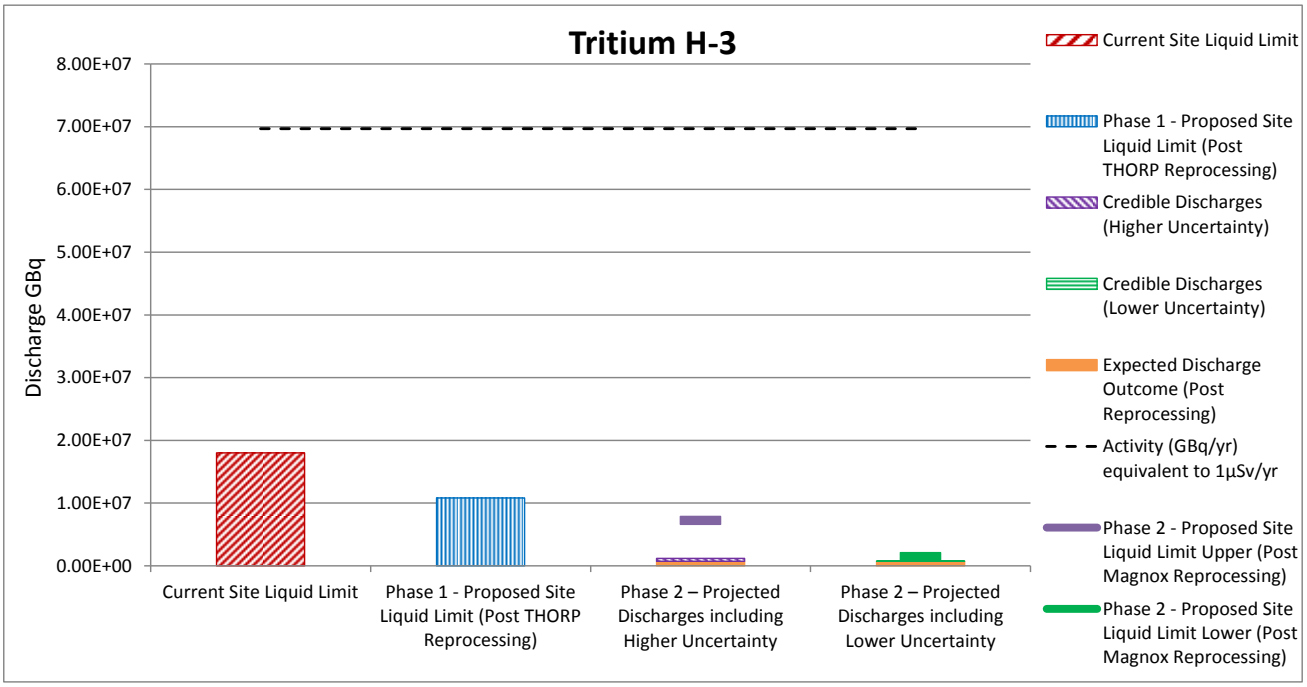


Figure 1 – Summary of H-3 Current & Proposed Site Liquid Limits and Uncertainties

Figure 2 shows the above chart with the 'activity (GBq/yr) equivalent to 1µSv/yr' line removed in order to show the 'Phase 2 – projected discharges…' bars more clearly

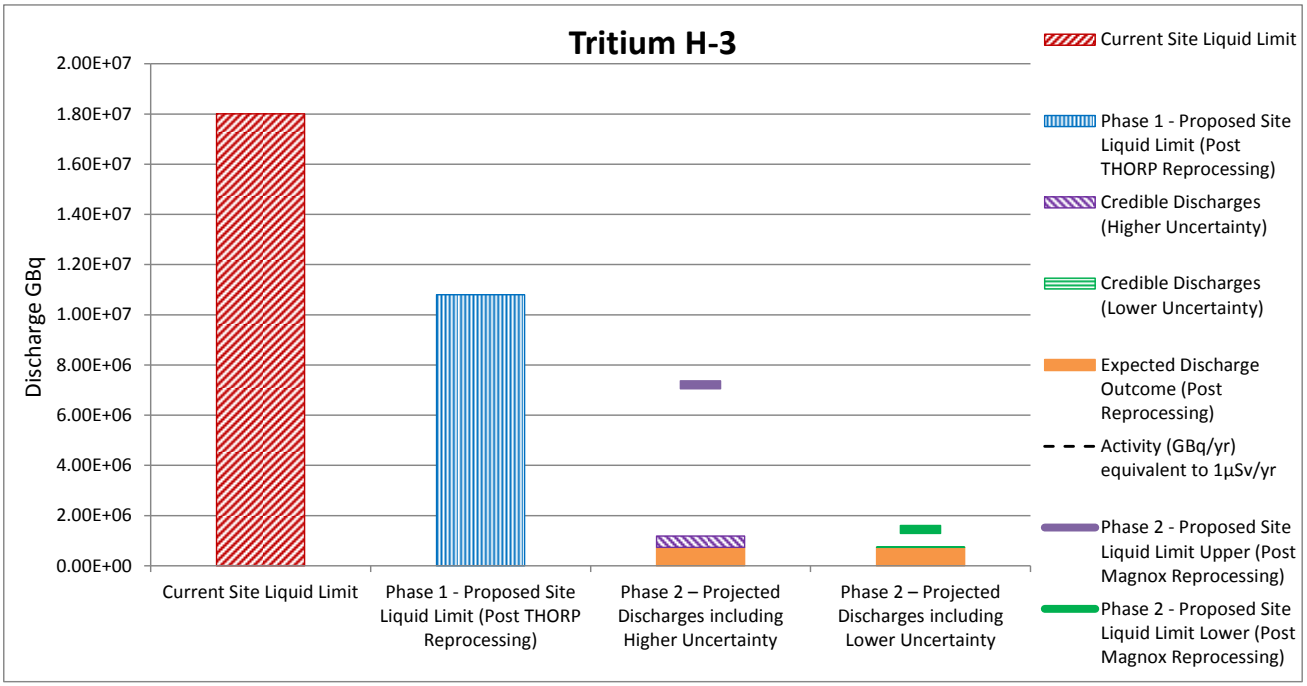


Figure 2 – Summary of H-3 Current & Proposed Site Liquid Limits and Uncertainties

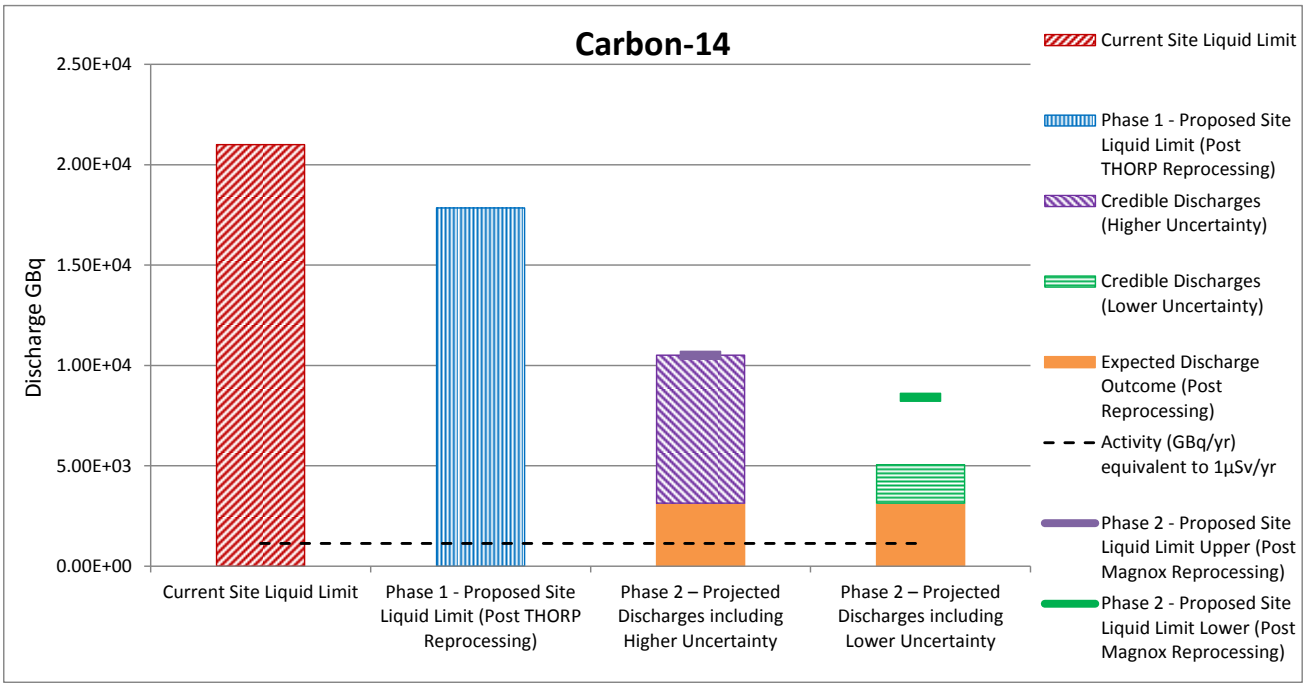


Figure 3 – Summary of C-14 Current & Proposed Site Liquid Limits and Uncertainties

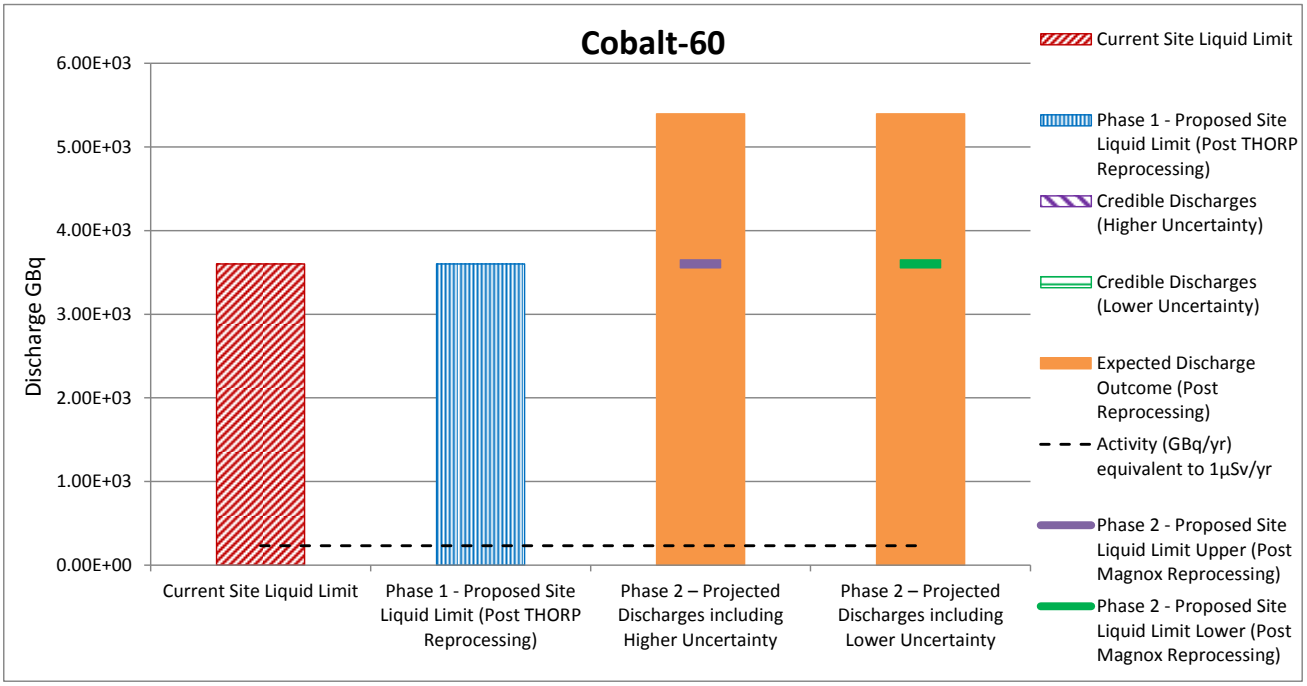


Figure 4 – Summary of Co-60* Current & Proposed Site Liquid Limits and Uncertainties

Note: Co-60 upper & lower uncertainty levels taken to be at current site liquid limit

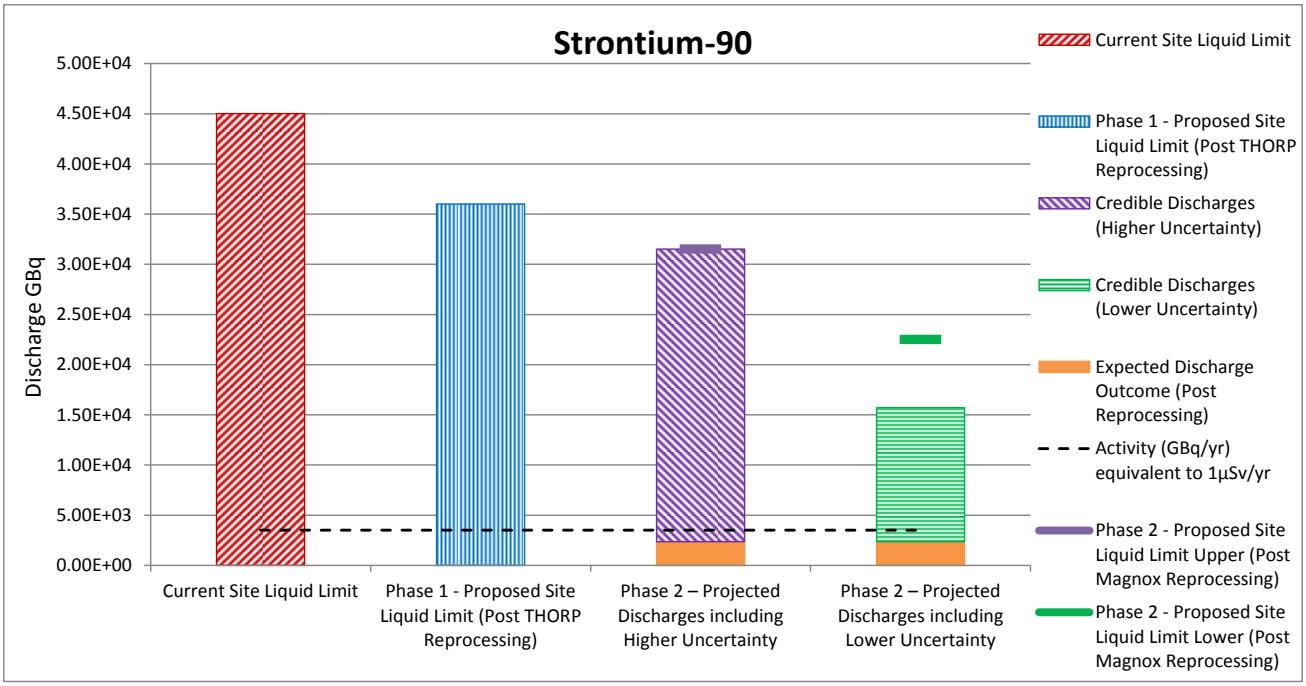


Figure 5 - Summary of Sr-90 Current & Proposed Site Liquid Limits and Uncertainties

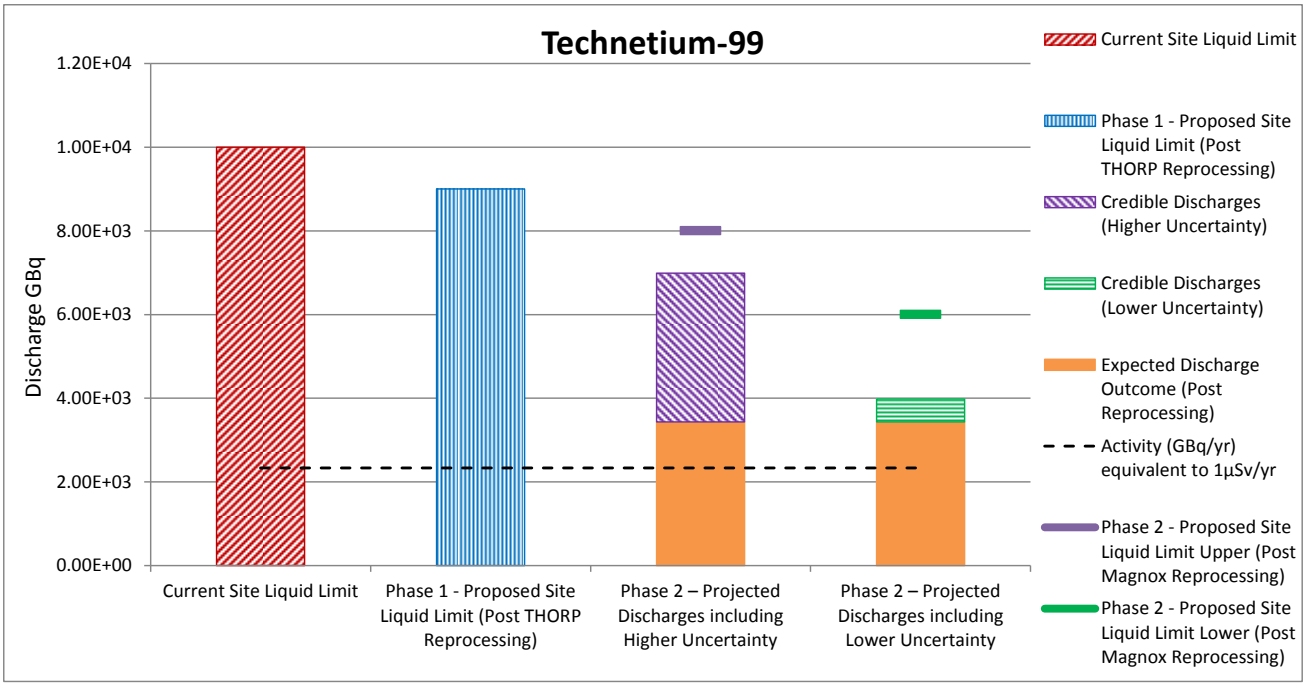


Figure 6 - Summary of Tc-99 current & proposed site liquid limits and uncertainties

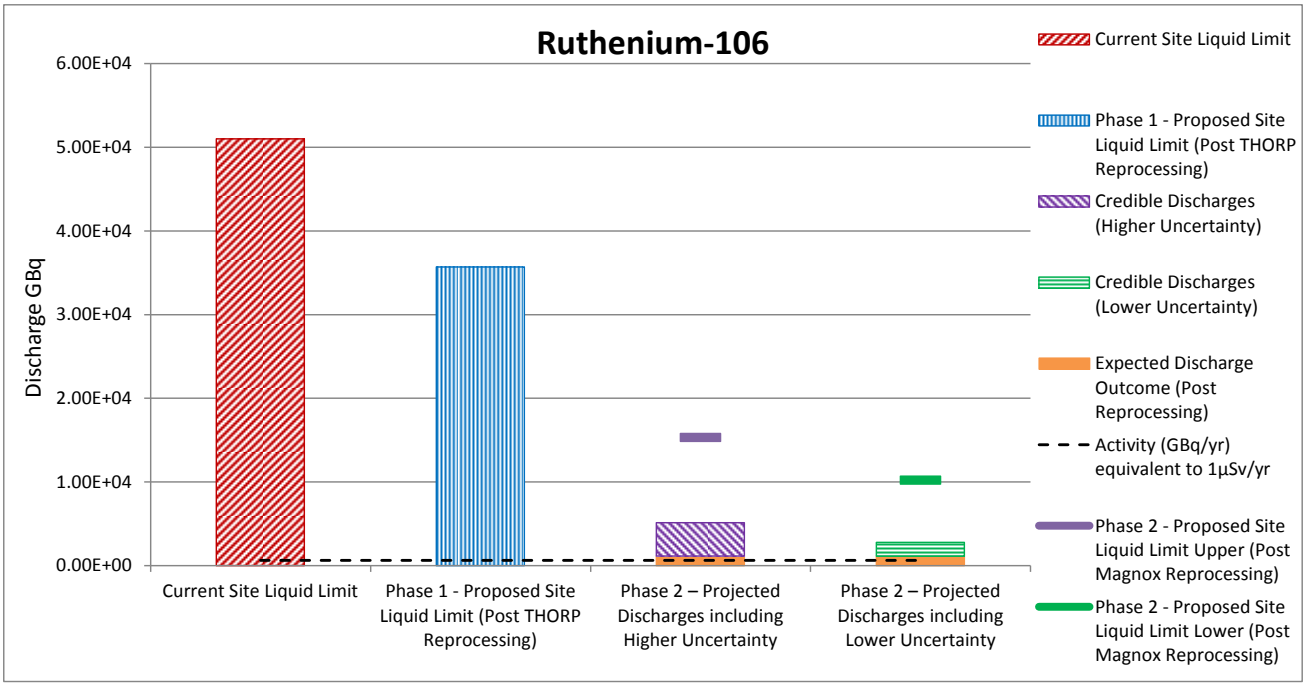


Figure 7 - Summary of Ru-106 current & proposed site liquid limits and uncertainties

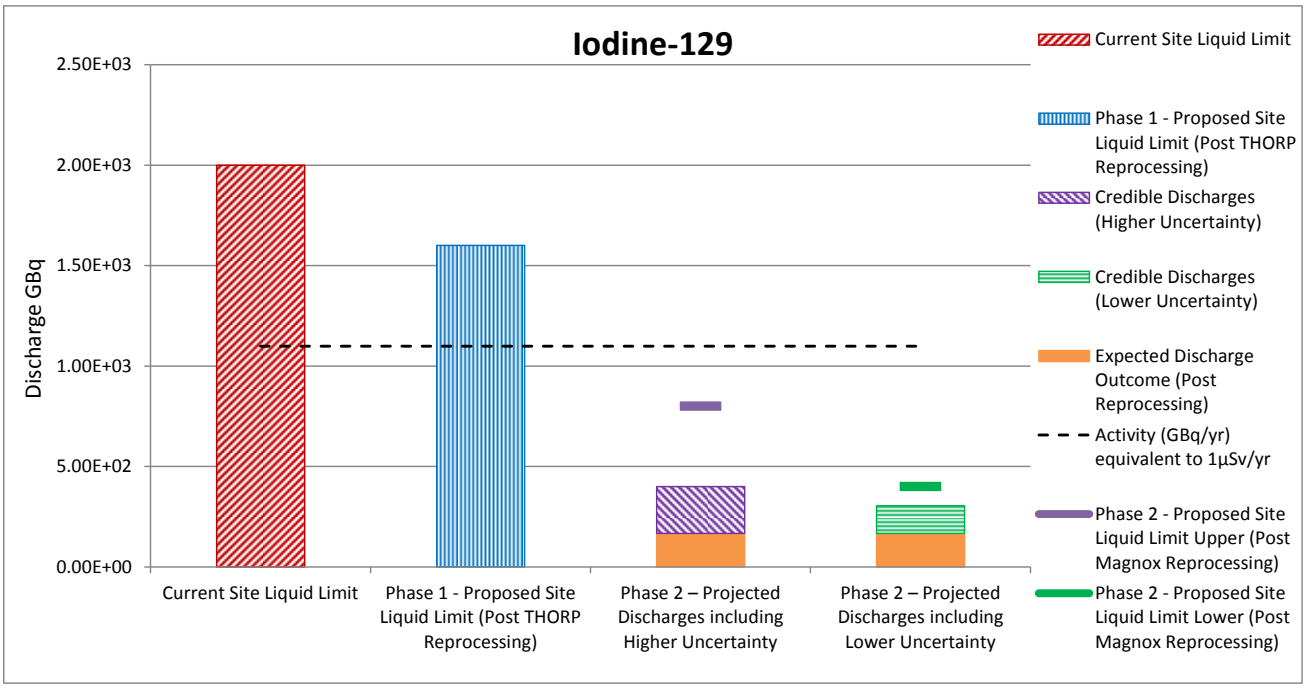


Figure 8 - Summary of I-129 current & proposed site liquid limits and uncertainties

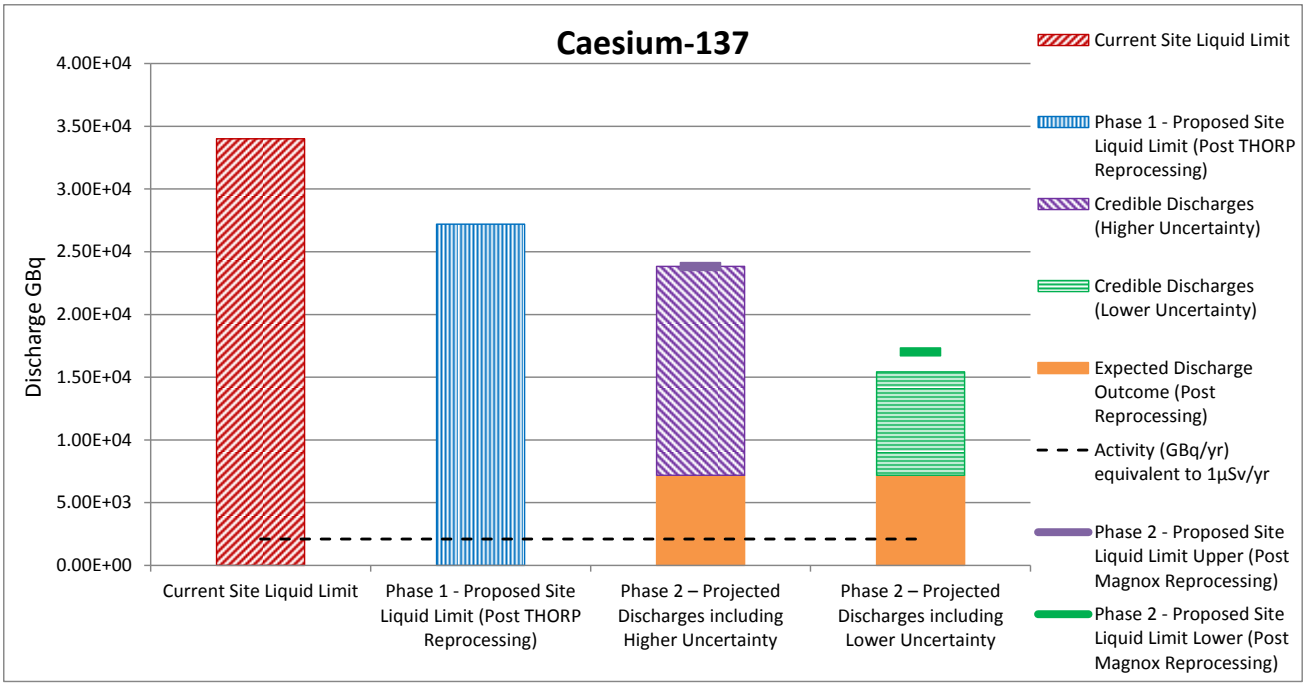


Figure 9 - Summary of Cs-137 current & proposed site liquid limits and uncertainties

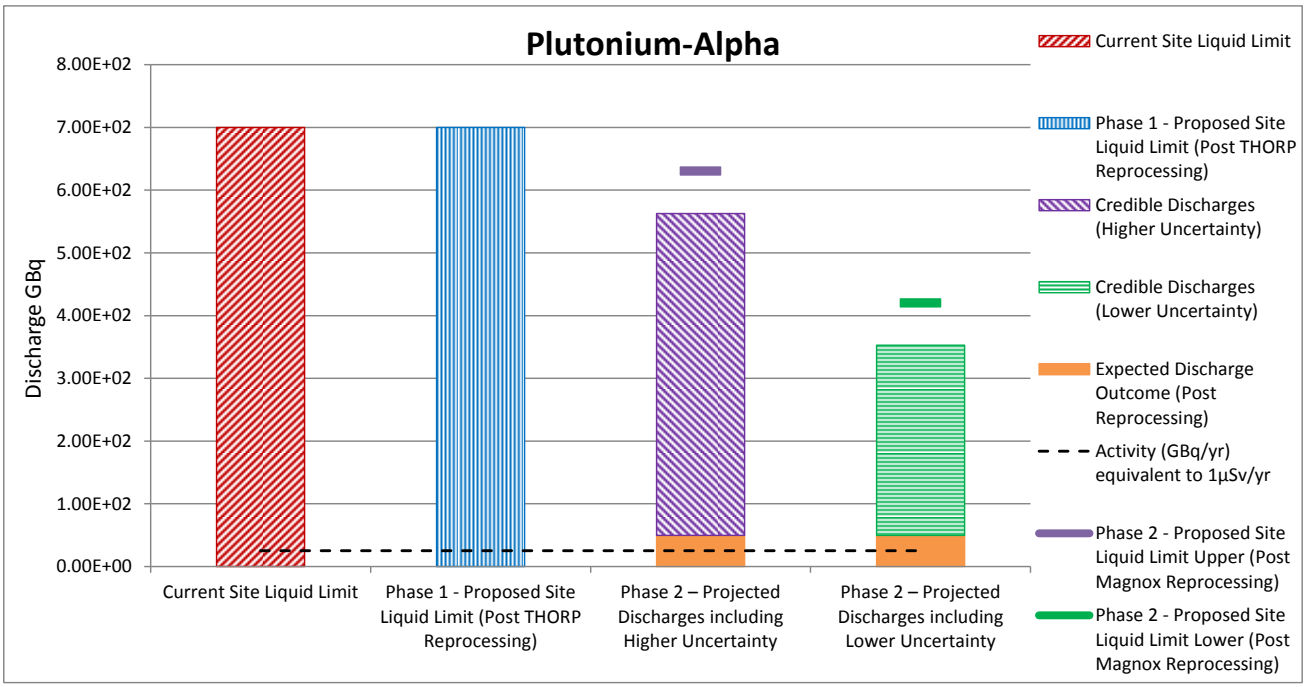


Figure 10 - Summary of Pu-Alpha current & proposed site liquid limits and uncertainties

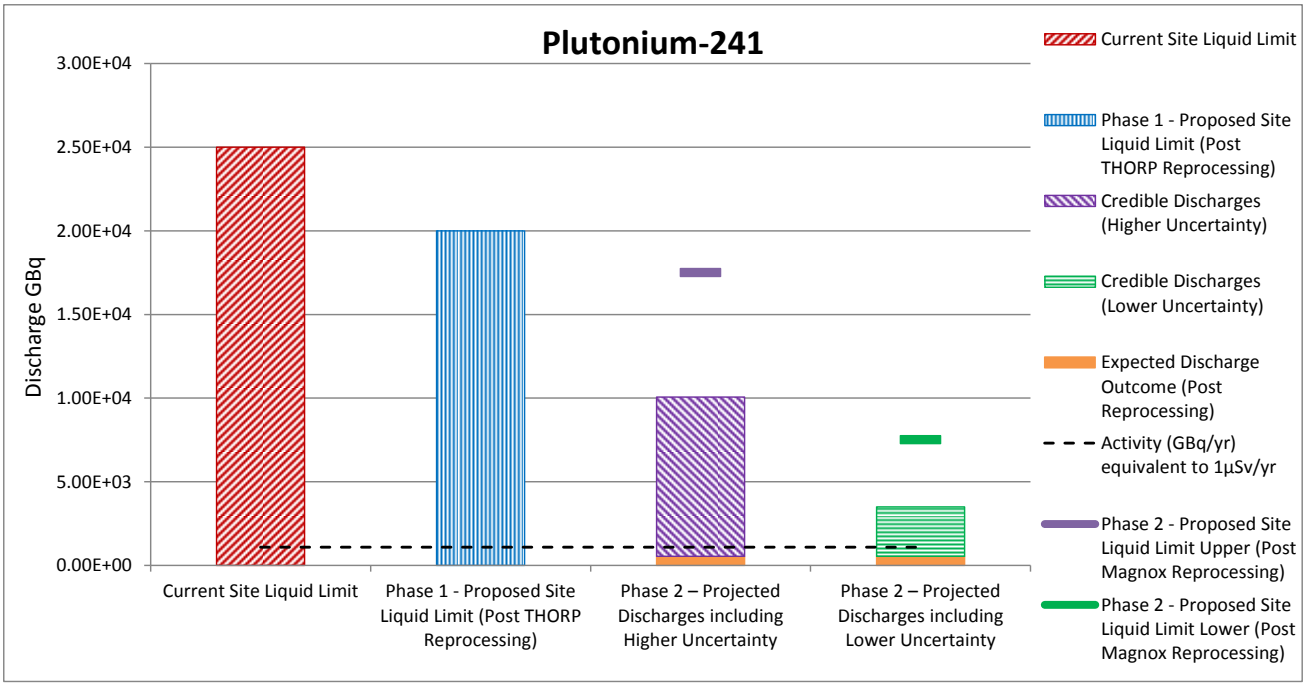


Figure 11 - Summary of Pu-241 current & proposed site liquid limits and uncertainties

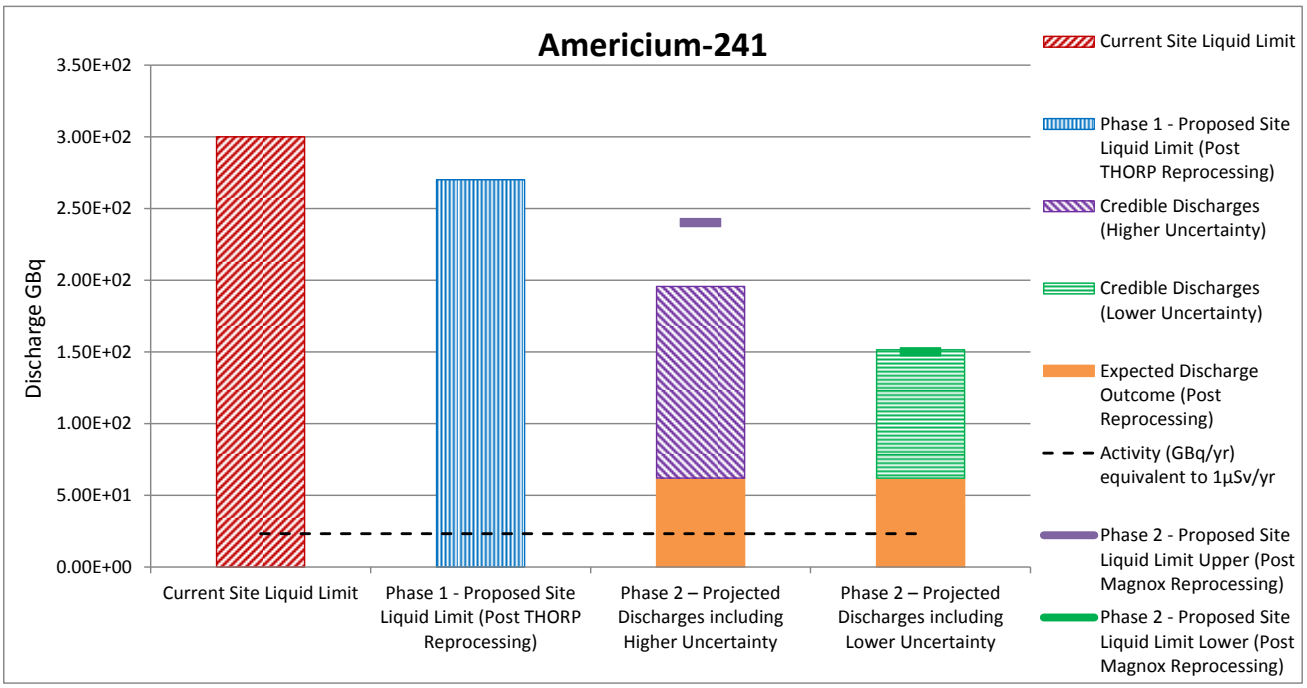


Figure 12 - Summary of Am-241 current & proposed site liquid limits and uncertainties

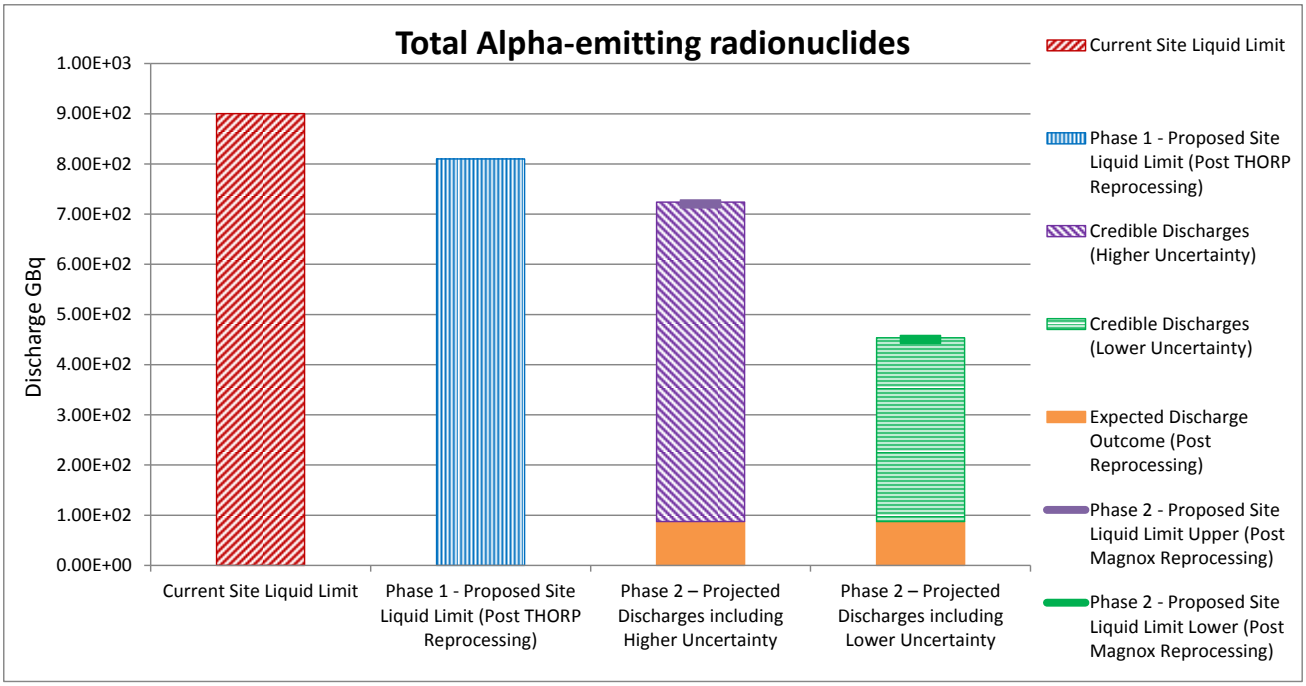


Figure 13 - Summary of Total Alpha current & proposed site liquid limits and uncertainties

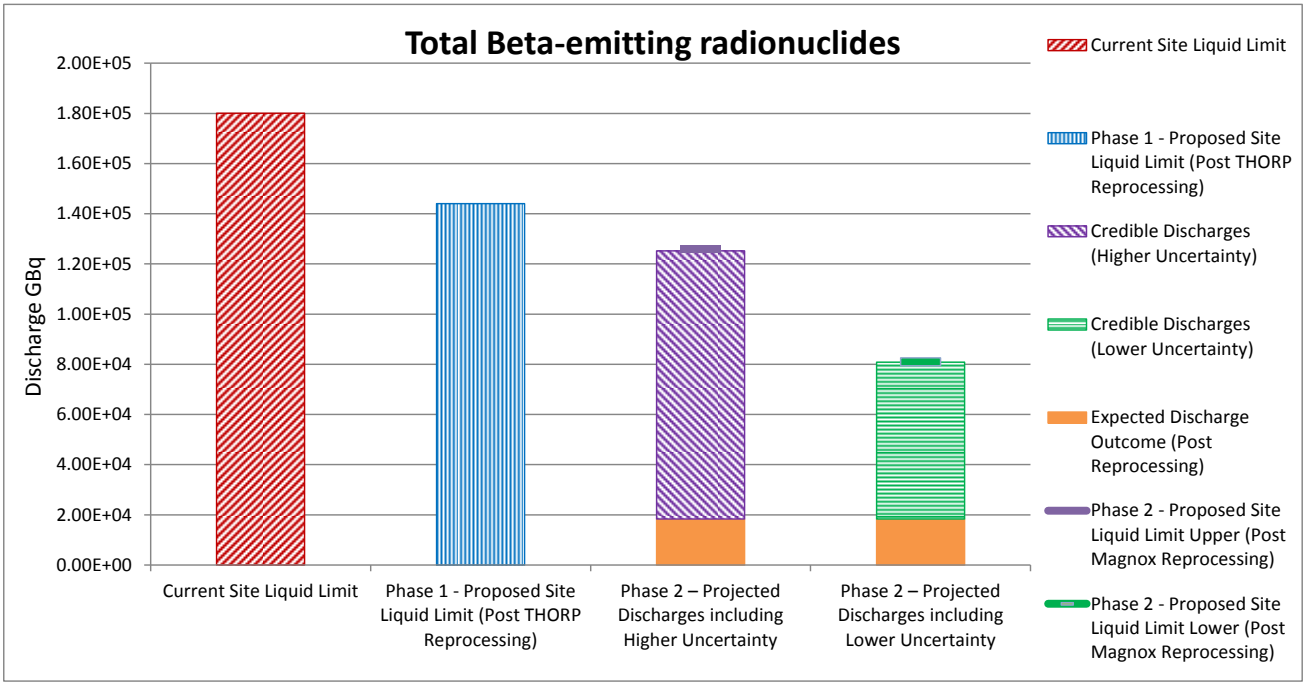


Figure 14 - Summary of Total Beta current & proposed site liquid limits and uncertainties

5.2 SEMS discharge projections to support proposed site gaseous discharge limits

Table 2 summarises the results from the gaseous uncertainty assessment and details the proposed limits:

Table 2 - Summary of current & proposed Phase 1 and Phase 2 site gaseous limits

	Current Site Gaseous Limit (MBq)	Phase 1		Phase 2							
		Phase 1 - Proposed Site Gaseous Limit (Post THORP Reprocessing) (MBq)	% Drop vs current limit	Phase 2 - Proposed Site Gaseous Limit Upper (Post MAGNOX Reprocessing) (MBq)	Upper Limit % Drop vs current limit	Phase 2 – Projected Discharges including Higher Uncertainty (MBq)	Projected Discharges including Higher Uncertainty % Drop vs current limit	Phase 2 - Proposed Site Gaseous Limit Lower (Post MAGNOX Reprocessing) (MBq)	Lower Limit % Drop vs current limit	Phase 2 – Projected Discharges including Lower Uncertainty (MBq)	Projected Discharges including Lower Uncertainty % Drop vs current limit
Tritium H-3	1.10E+09	7.15E+08	35%	5.50E+08	50%	1.68E+08	85%	2.20E+08	80%	1.14E+08	90%
Carbon-14	3.30E+06	2.48E+06	25%	2.31E+06	30%	4.79E+05	85%	1.65E+06	50%	3.22E+05	90%
Krypton-85	*4.40E+11*	*1.76E+11*	60%	*Remove*		*Remove*		*Remove*		*Remove*	
Strontium-90	7.10E+02	5.68E+02	20%	4.97E+02	30%	1.07E+02	85%	4.97E+02	30%	6.91E+01	90%
Ruthenium-106	2.30E+04	1.96E+04	15%	1.96E+04	15%	1.19E+03	95%	1.96E+04	15%	5.64E+02	98%
Antimony-125	*3.00E+04*	*3.00E+04*	0%	*Remove*		*Remove*		*Remove*		*Remove*	
Iodine-129	7.00E+04	4.90E+04	30%	4.20E+04	40%	1.78E+04	75%	2.80E+04	60%	1.03E+04	85%
Iodine-131	*3.70E+04*	*Remove*		*Remove*		*Remove*		*Remove*		*Remove*	
Caesium-137	5.80E+03	4.80E+03	17%	4.80E+03	17%	1.69E+03	71%	4.80E+03	17%	1.38E+03	76%
Plutonium-Alpha	1.90E+02	1.52E+02	20%	1.33E+02	30%	1.13E+02	40%	1.33E+02	30%	1.04E+02	45%
Plutonium-241	*3.00E+03*	*Remove*		*Remove*		*Remove*		*Remove*		*Remove*	
Americium-241 & Curium-242 in total	1.20E+02	8.40E+01	30%	8.40E+01	30%	5.97E+01	50%	8.40E+01	30%	4.54E+01	62%
Alpha-emitting radionuclides	8.80E+02	6.60E+02	25%	6.60E+02	25%	3.05E+02	65%	4.40E+02	50%	2.68E+02	70%
Beta-emitting radionuclides	4.20E+04	3.15E+04	25%	3.15E+04	25%	6.41E+03	85%	2.10E+04	50%	4.57E+03	89%

The following charts below (Figure 15 - Figure 24) represent the supporting information through which the limits have been arrived at.

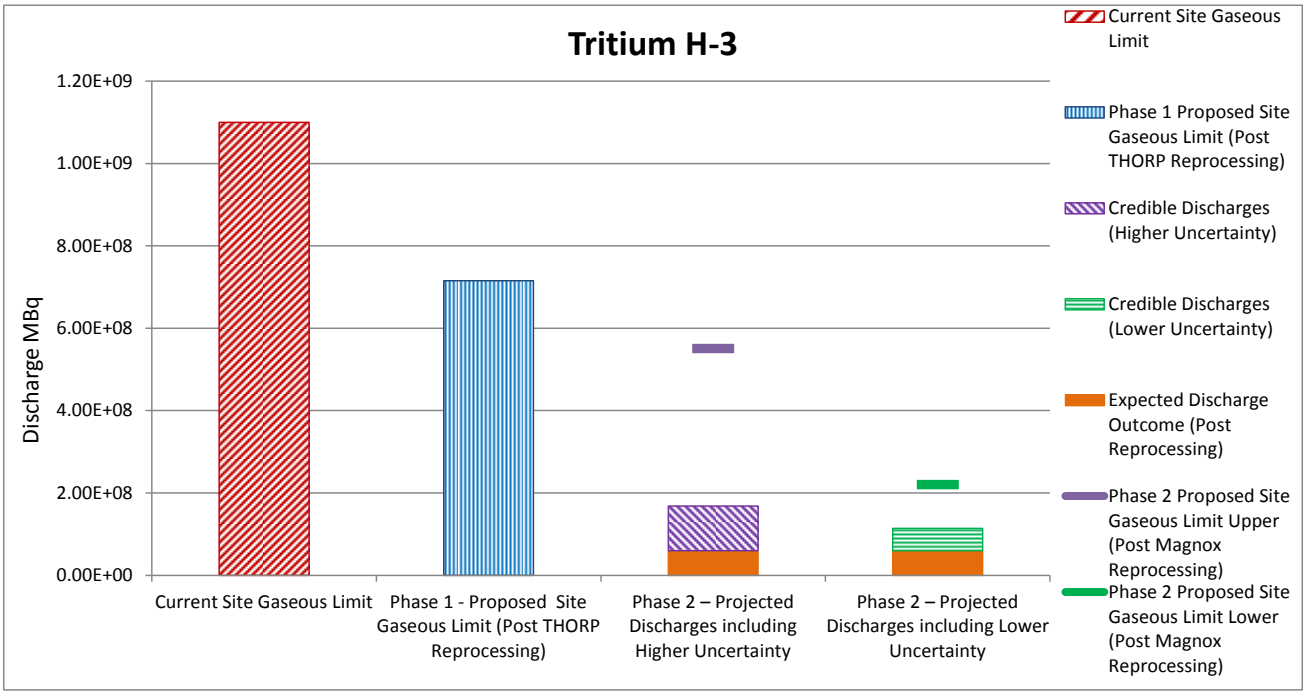


Figure 15 - Summary of H-3 current & proposed site gaseous limits and uncertainties

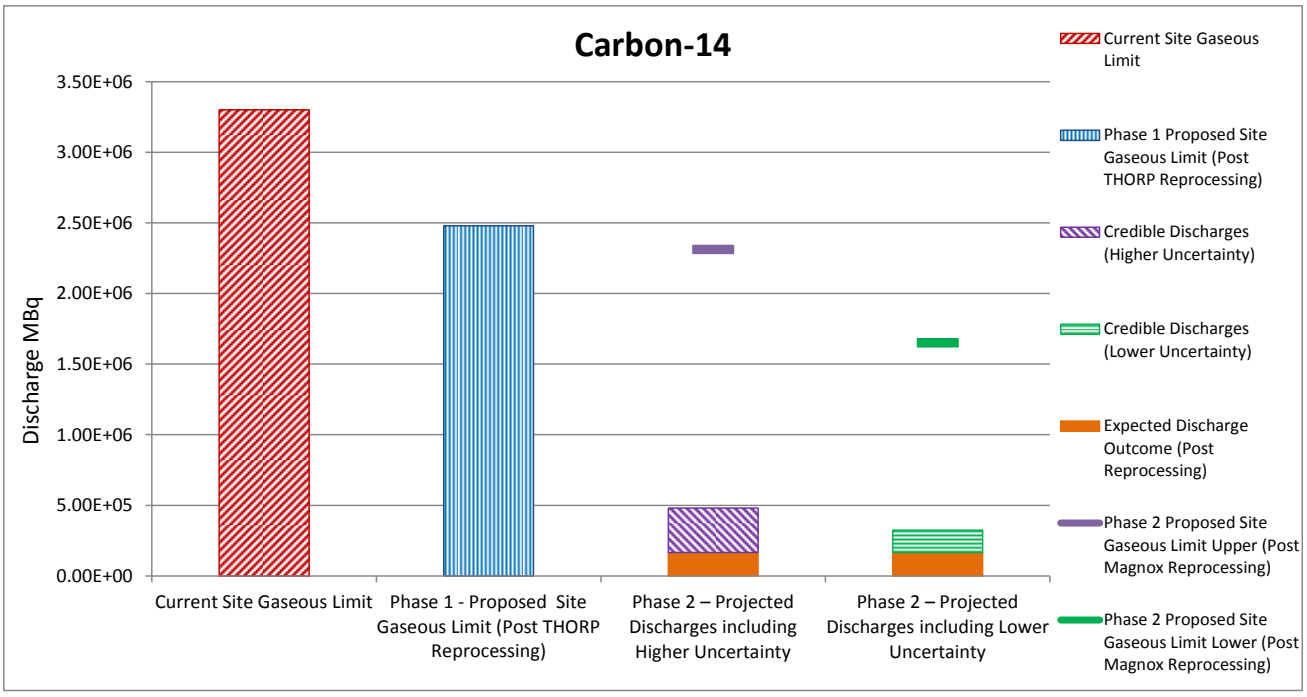


Figure 16 - Summary of C-14 current & proposed site gaseous limits and uncertainties

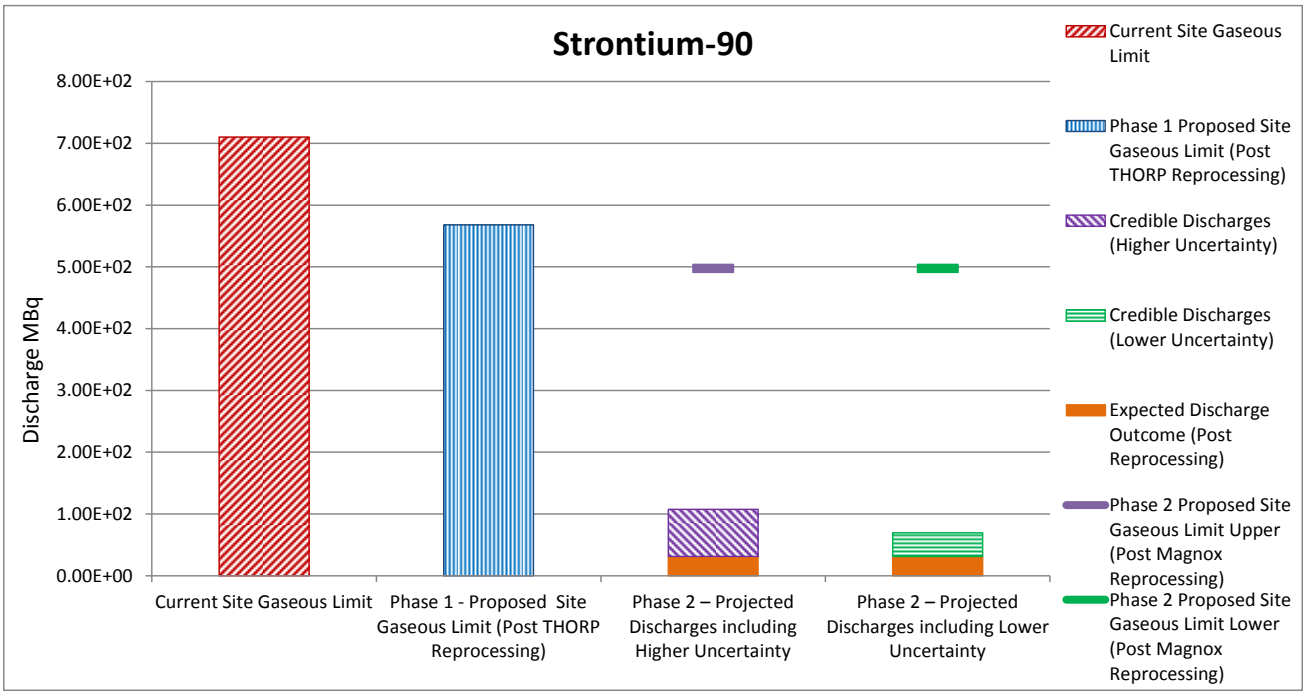


Figure 17 - Summary of Sr-90 current & proposed site gaseous limits and uncertainties

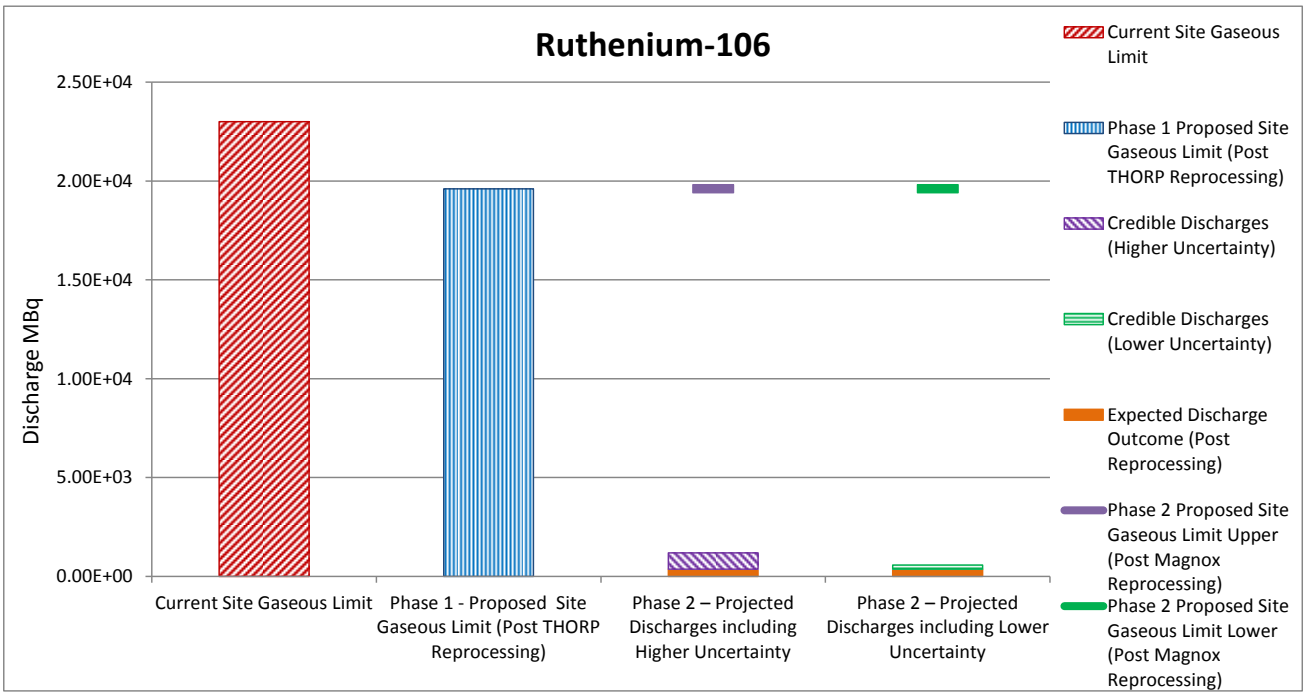


Figure 18 - Summary of Ru-106 current & proposed site gaseous limits and uncertainties

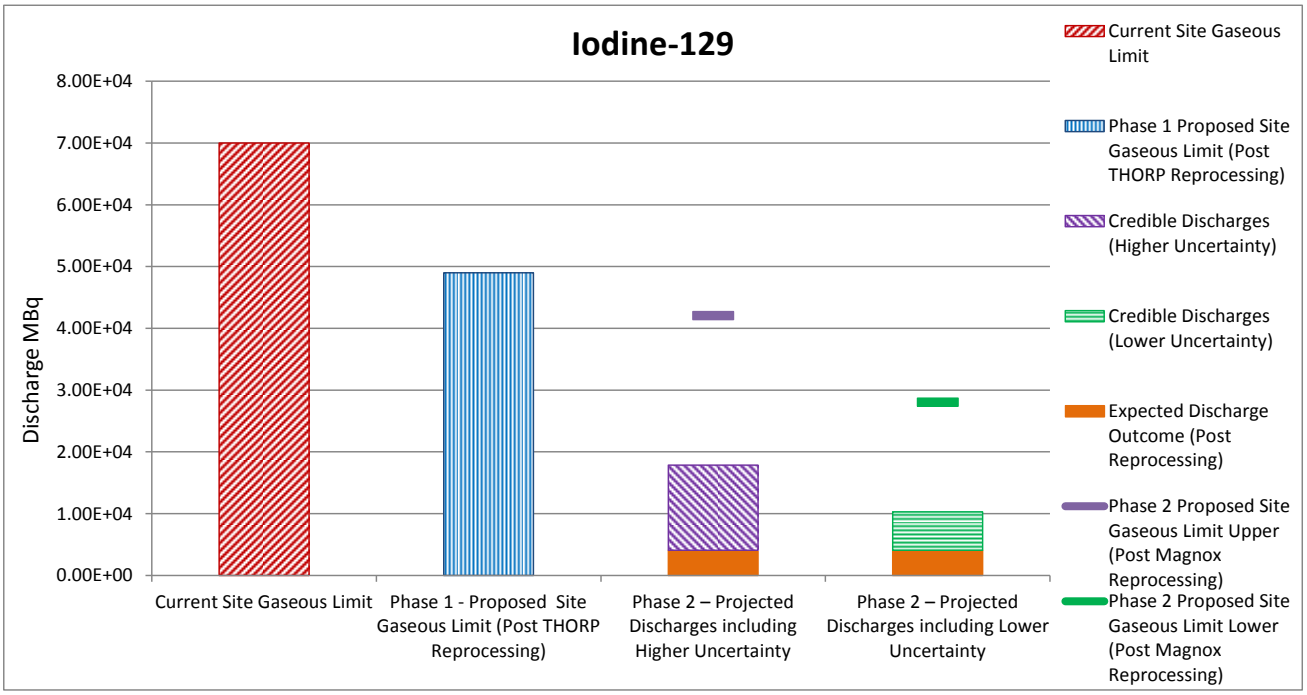


Figure 19 - Summary of I-129 current & proposed site gaseous limits and uncertainties

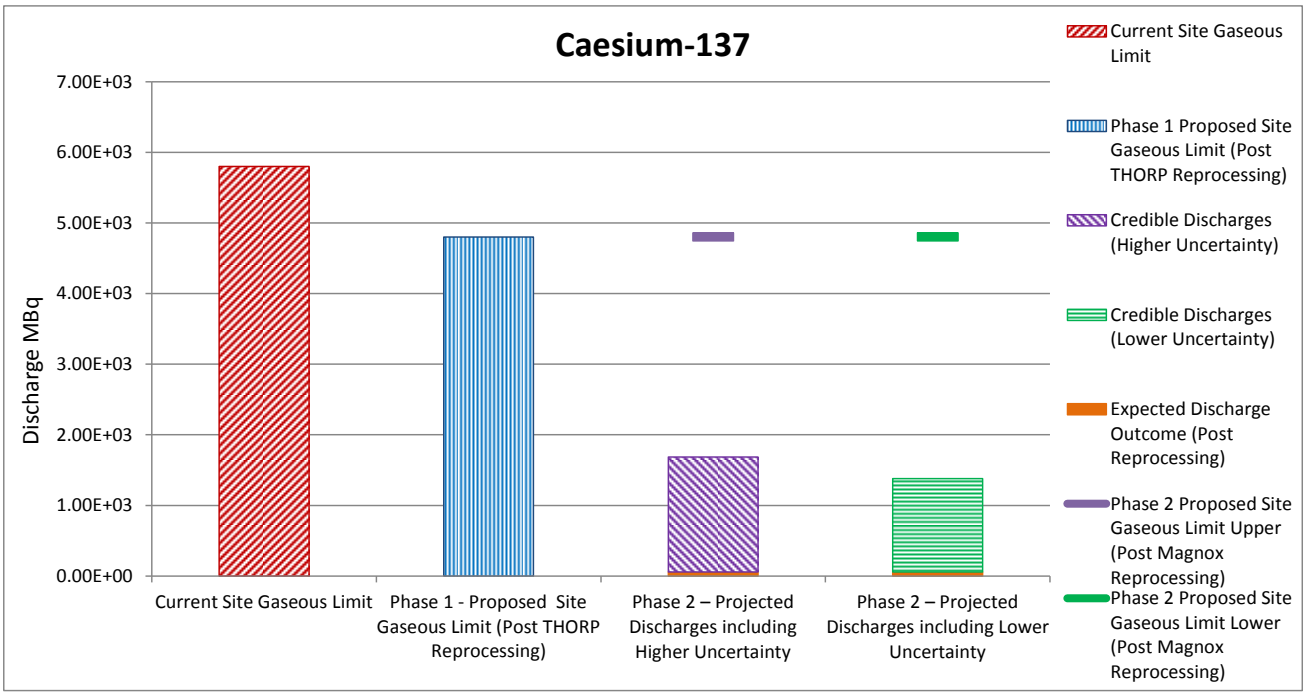


Figure 20 - Summary of Cs-137 current & proposed site gaseous limits and uncertainties

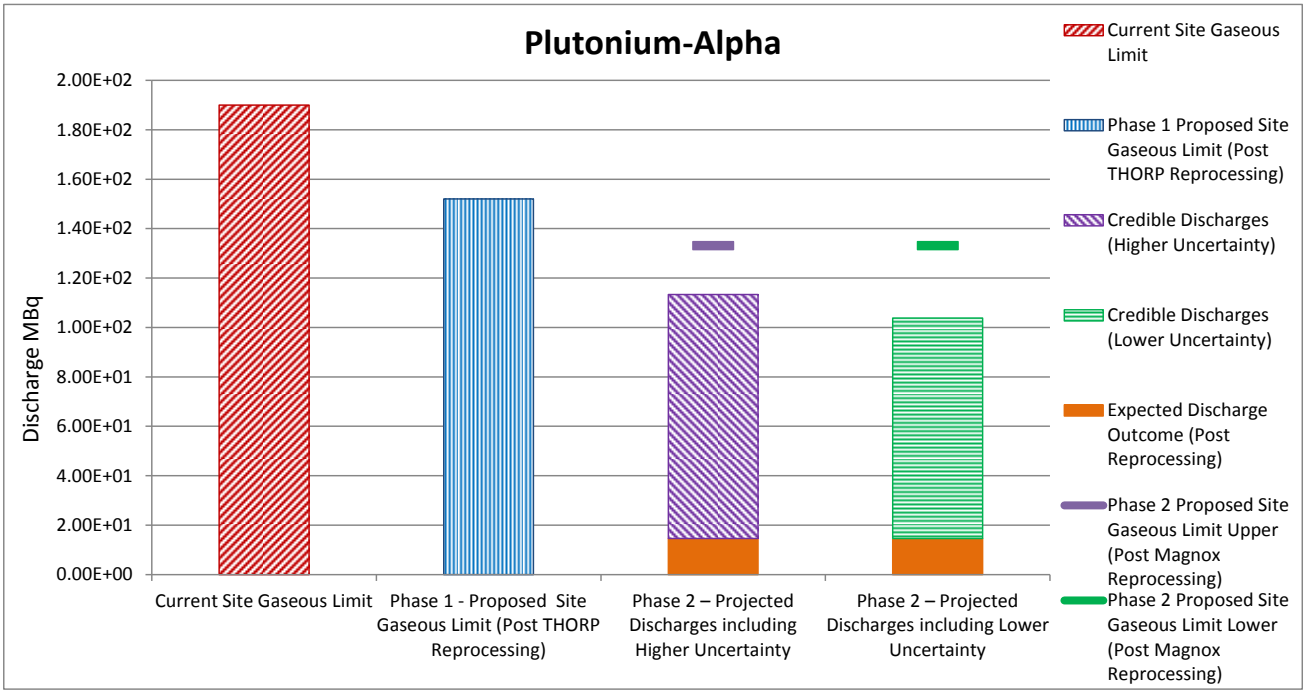


Figure 21 - Summary of Pu-Alpha current & proposed site gaseous limits and uncertainties

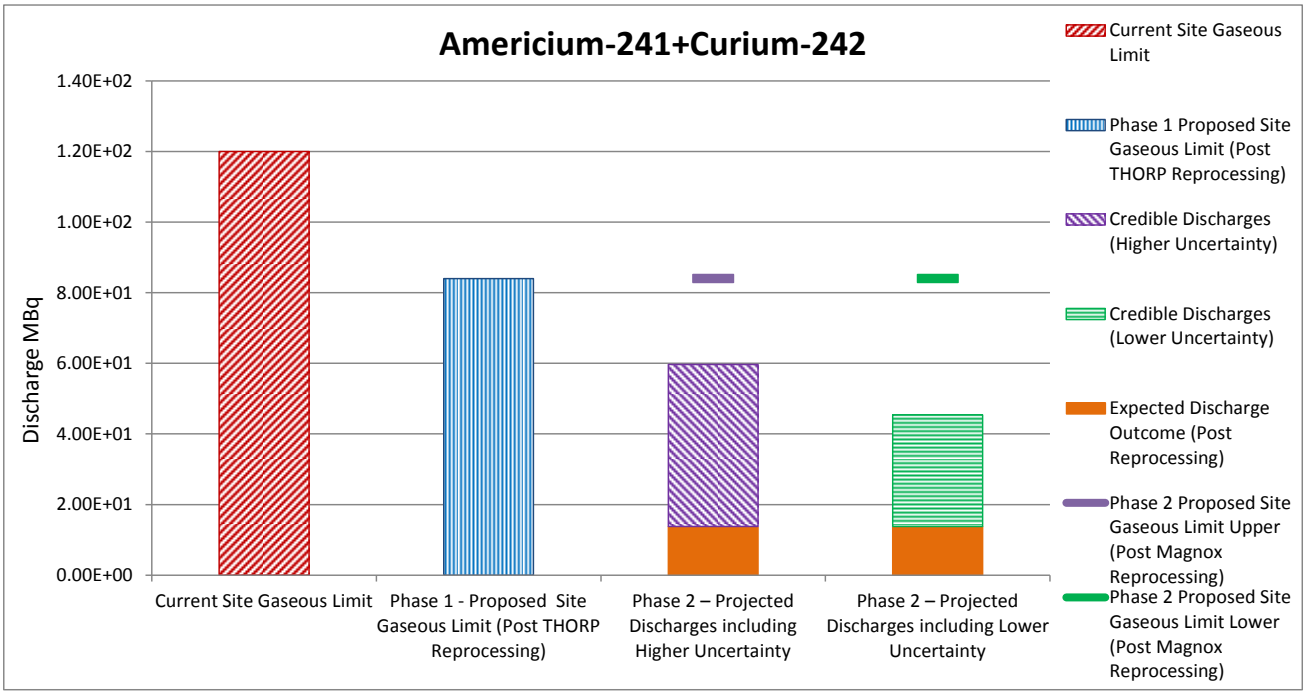


Figure 22 - Summary of Am-241+Cm-242 current & proposed site gaseous limits and uncertainties

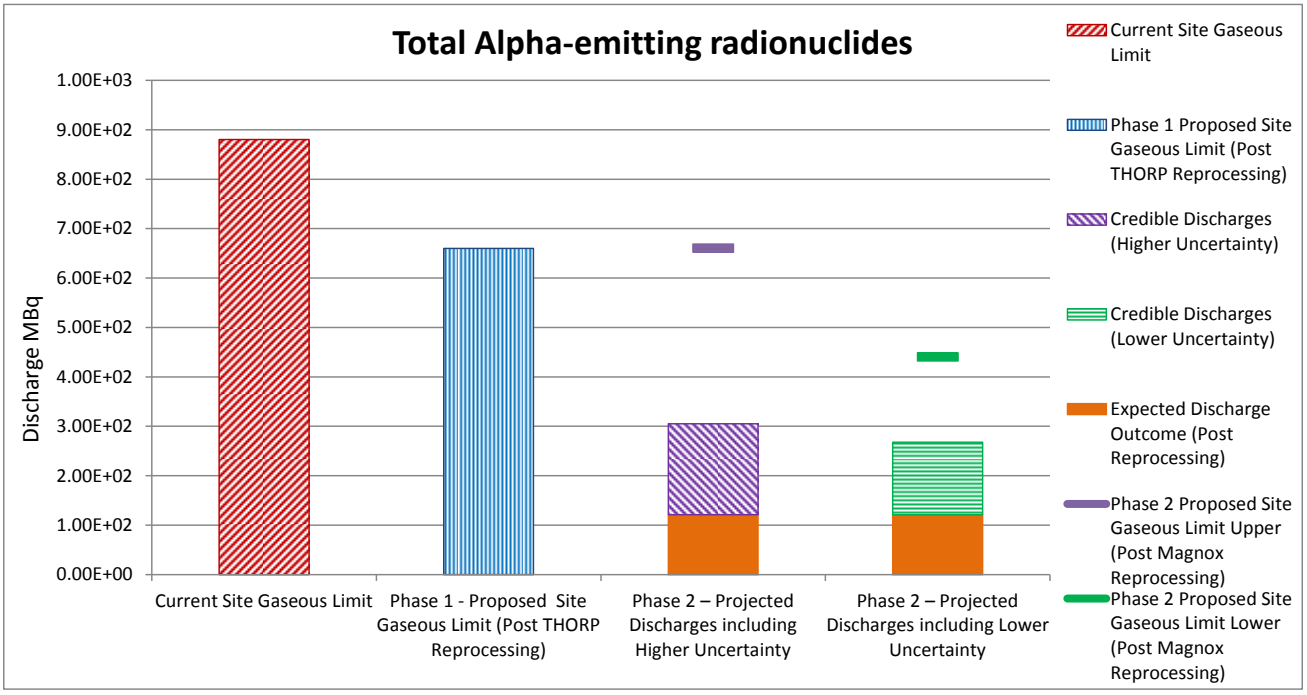


Figure 23 - Summary of Total Alpha current & proposed site gaseous limits and uncertainties

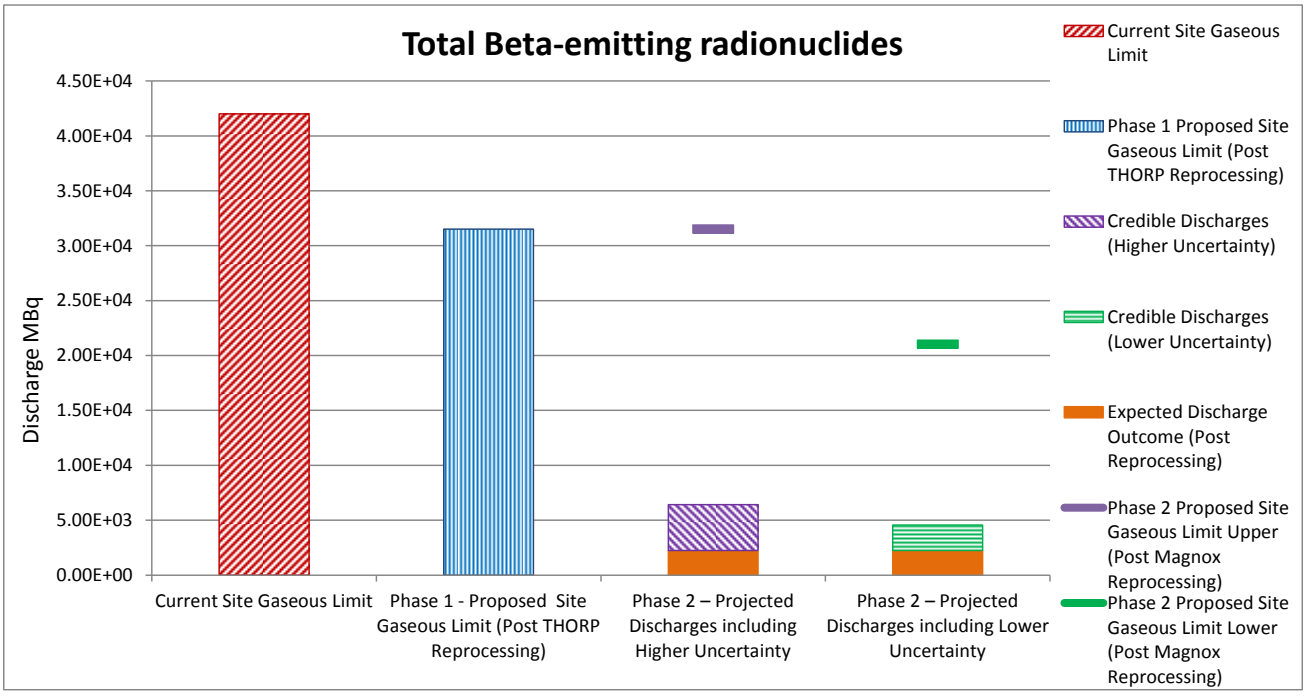


Figure 24 - Summary of Total Beta current & proposed site gaseous limits and uncertainties

6. Sellafield effluent management key uncertainties

6.1 Key uncertainties impacting projected liquid discharges

Table 3 - Summary of liquid effluent uncertainties

Species	Number of Uncertainties Considered	Summary of Key Uncertainties for Liquid Effluents
H-3	18	No major uncertainties associated with post reprocessing activities, that is after cessation of fuel dissolution and processing the dissolved fuel to final products Some uncertainty from long term storage of non-reprocessed fuel e.g. Uncemented Bit Bins (UBB)
C-14	31	Dominated by Legacy Ponds & Silos (LP&S) retrievals operations and the magnitude of challenge will only be revealed once retrievals starts – especially from Magnox Swarf Storage Silos (MSSS)
C-60	14	Dominated by LP&S retrievals operations and magnitude of challenge will only be revealed once retrievals starts – Especially from MSSS, factors including but not limited to: - MSSS flowsheet Release Fraction for Co-60 variability under consideration (sludge into liquor) - SIXEP abatement performance at increased challenge

Species	Number of Uncertainties Considered	Summary of Key Uncertainties for Liquid Effluents
Sr-90	31	Main contributors to uncertainty are: - LP&S retrievals operations - Long term storage of UBB fuel in Fuel Handling Plant (FHP) - Sludge chemistry e.g. absorption and desorption - SIXEP's abatement performance – this is dependent on several factors, including but not limited to : o Extended bed lives and/or pre-treated Clinoptilolite o Totality of the challenge to plant for all species o Competing ions o Colloids management o Organics management Preferentially absorbed by magnox sludge and uncertain how much will be released into surrounding liquor during retrieval operations Elevated Sr-90 activity associated with Sludge Packaging Plant 1 (SPP1) supernate and decant management Uncertainty in discharges from Enhanced Actinide Removal Plant (EARP) once upstream facilities commence Post Operational Clean Out (POCO) - discharges may increase due to use of non-native chemical reagents to clean out upstream facilities. This may also affect EARP abatement performance. Highly Active Liquor Evaporation & Storage POCO plant feed to Medium Active Salt Free Evaporation that can potentially impact discharges
Tc-99	14	Future uncertainties dominated by MSSS retrievals flowsheet, POCO feeds into EARP and Floc Storage Tank Retrievals
Ru-106	5	Low overall uncertainty and impact on Site discharges – peak impact may increase slightly if retrievals schedules are accelerated, but total overall discharge will be the same
I-129	3	Low overall uncertainty and impact on Site discharges – peak impact may increase slightly if retrievals schedules are accelerated, but total overall discharge will be the same

Species	Number of Uncertainties Considered	Summary of Key Uncertainties for Liquid Effluents
Cs-137	38	Main contributors to uncertainty are: - LP&S retrievals operations - Long term storage of UBBs fuel in FHP - Sludge chemistry e.g. absorption and desorption - SIXEP's abatement performance – this is dependent on several factors, including but not limited to : o Extended bed lives and/or pre-treated Clinoptilolite o Totality of the challenge to plant for all species o Competing ions o Uncertain how much will be released into surrounding liquor during retrieval operations o Colloids management o Organics management
Pu-Alpha	25	Main contributors to uncertainty are: - Uncertainty relating to SIXEP Waste Management (SWM) effluent arisings in terms of radiological challenge, composition, and amount of competing ions present – all of which have a detrimental effect on SIXEP abatement - LP&S retrievals operations as well as long term storage of UBBs fuel in FHP - Sludge chemistry e.g. absorption and desorption - Possibility of colloids and fines present in LP&S effluents, reducing SIXEP's alpha particulate abatement - Elevated Sr-90 activity associated with SPP1 supernate and decant management - EARP abatement performance post reprocessing, including but not limited to: o Processing of low iron feeds o Feed changes to support the Highly Active / Medium Active loop break
Pu-241	30	Same as Pu-Alpha
Am-241	14	Same as Pu-Alpha
Total Alpha	38	Same as Pu-Alpha

Species	Number of Uncertainties Considered	Summary of Key Uncertainties for Liquid Effluents
Total Beta	48	Same as main Beta emitting radionuclides, principally Sr90, Cs137 and Co60. Contributors to uncertainty are: - LP&S retrievals operations as well as long term storage of UBBs fuel in FHP - Availability of SIXEP contingency plant - SIXEP / EARP performance based on new effluent streams e.g. retrievals / POCO effluents - Increased donor plant challenge
Na	17	- Affects SIXEP abatement performance for beta activity e.g. Cs-137 and Sr-90 - Main uncertainties are around future donor plant flowsheets (e.g. SWM) and SIXEP operations (e.g. low flow)
K	10	- Affects SIXEP abatement performance for beta activity e.g. Cs-137 and Sr-90 - Main uncertainties are around future donor plant flowsheets (e.g. SWM) and SIXEP operations (e.g. low flow)
Ca	9	Uncertainty around SIXEP donor predictive flowsheets
Cr	6	Dominated by SWM future process flowsheet
U	9	Dominated by SWM future process flowsheet
Zn	6	Dominated by SWM future process flowsheet
Cl^-	9	Dominated by MSSS retrievals flowsheet

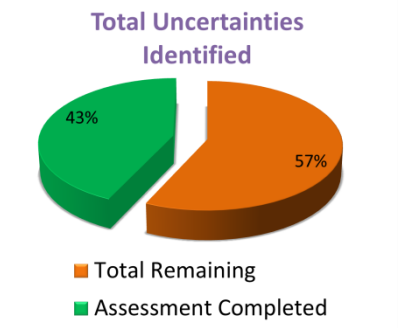
6.2 Key uncertainties impacting Projected Gaseous Discharges

Table 4 - Summary of Gaseous Effluent Uncertainties

Species	Number of Uncertainties Considered	Summary of Key Uncertainties for Gaseous Effluents
H-3	2	Uncertainties arise due to: - POCO sequences of reprocessing related plants not yet determined and may result in different arisings profile from modelling assumptions - Piles 1 and 2 decommissioning planning has not yet assessed potential discharges during removal of fuel, isotopes and graphite
C-14	3	Uncertainties arise due to: - POCO sequences of reprocessing related plants not yet determined and may result in different arisings profile from modelling assumptions - BAT determination for the end of caustic scrubber operations may result in reduced liquid discharges with corresponding increased gaseous discharges - Piles 1 and 2 decommissioning planning has not yet assessed potential discharges during removal of fuel, isotopes and graphite
Kr-85	0	Only discharged during fuel dissolution: no uncertainties identified
Sr-90	2	Uncertainties arise due to: - Risk of unexpected dislodging post-filter accumulations during decommissioning - Impact of limit of detection on reported vs projected discharges
Ru-106	2	Uncertainty mainly from vitrification plant performance during remainder of highly active liquor programme, including POCO
Sb-125	2	Predominantly discharged from decanning and subsequent handling of certain Magnox fuels. Uncertainty mainly from assumptions about FHP decanners POCO sequencing

Species	Number of Uncertainties Considered	Summary of Key Uncertainties for Gaseous Effluents
I-129	2	Uncertainties arise due to: - POCO sequences of reprocessing related plants not yet determined and may result in different arisings profile from modelling assumptions - BAT determination for the end of caustic scrubber operations may result in reduced liquid discharges with corresponding increased gaseous discharges
I-131	3	Insignificant discharge of short lived isotope which contributes only nanoSievert to reference group dose
Cs-137	2	Uncertainties arise due to: - Risk of unexpected dislodging post-filter accumulations during decommissioning - Impact of limit of detection on reported vs projected discharges
Pu-Alpha	2	Uncertainties arise due to: - Unexpected dislodgement of historic contamination from Analytical Services ventilation system and stack during remaining operations and decommissioning period - Impact of limit of detection on reported vs projected discharges
Pu-241	2	Same as Pu-Alpha
Am241& Cm-242	2	Same as Pu-Alpha
Alpha-particulates	3	Discharges dominated by Open Fuel Pond Surfaces (First Generation Magnox Storage Pond [FGMSP]). Uncertainties arise from: - Pond water disturbance during FGMSP inventory removal - Risk of dislodging post-filter accumulations during plant decommissioning - Analytical limits of detection may impact reported discharges as discharges reduce
Beta-particulates	3	Same as Alpha-particulates

6.3 Pie Chart showing the total number of uncertainties completed and remaining



Assessments have been completed for approximately one third of identified uncertainties. There is an ongoing work programme to complete the remaining assessments as source data and forward predictions are improved. Some uncertainties will only be fully assessed once waste retrieval and decommissioning activities have commenced and actual process performance can be established.

7. Acronyms

Article 37	Article 37 of the Euratom Treaty (Reference 1)
BAT	Best Available Techniques
EARP	Enhanced Actinide Removal Plant
EA	Environment Agency
EAGLE	Environmental Analysis of Gaseous and Liquid Effluents database
FGMSP	First Generation Magnox Storage Pond
FHP	Fuel Handling Plant
LP&S	Legacy Ponds & Silos
MSSS	Magnox Swarf Storage Silos
OESM	Overall Effluent Strategy Model
POCO	Post Operational Clean Out
RSA	Radioactive Substance Activity
SAMP	Sellafield Activity Management Project
SEMS	Sellafield Effluent Management Strategy
SIXEP	Site Ion eXchange Effluent Plant
SWM	SIXEP Waste Management
SPP1	Sludge Packaging Plant 1
THORP	Thermal Oxide Reprocessing Plant
UBB	Uncemented Bit Bins

8. References

1. Consolidated version of the treaty establishing the European atomic energy community