Gansto OHSE Form

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Risk Management – OHSE Approval

Request for OHSE Approval

SAC No: /	File Sec is r	e Number: cretary, SAC, will all eceived.	ocate this number when the form
Previous SAC No (if applicat			
Frevious SAC No (il applicat	je).		
Title: ANSTO Campe decommissionir	rdown 30 MeV Cyclotr ng	on and radiopharma	aceuticals production
Location of Proposed One	ration	Building No: NM	^
		Room No: Sev	eral
Type of Submission and the	ne OHSE Category	New	OHSE Category A
 Urgent SAC Approval red 	quests must be made i	n Renewal	OHSE Category B
writing to the Chair of SA	C by your GM/IH.	Modified	
Consult ANSTO Risk Ma	nagement – OHSE	- Urgent	
OHSE Category	Guide to determine th	e	
Proposed Date of Commen	cement:	November 20	010
Frequency and Expected F	ull Term Operation of	f the Described in	the Decommissioning Plan AC-D-
Process or Facility:		LA-E7a	C .
Responsible Officer:	Gary Simms	Signature:	2 and a later
Engineering Services	Alec Kimber	Date: Signature:	
Project Leader:		Signature.	All
(if applicable)	(Insert Name)	Date:	8/7/2010
			/ - /
······································	Radiological Classi	fication of the Loca	ality
Radiation: White		Contamin	ation: White
Blue			Blue 🖂
Red			Red 🖂
Area Supervisor:	Gary Simms	Signature:	
	(Date:	
I have reviewed the information	ation in this Request	for OHSE Approva	I and am satisfied with the
safety of the operation/faci	lity described herein.		\frown
Line Manager/	Andy Garcia	Signatu	re:
Officer-in-Charge:	M. Deurz A	IM MPDO	- VIN Jelina
	(เกออาเานสก	Date:	41710/
Noted by Facility Officer	Gary Simms	Signatu	re'
(if applicable)		Signatu	S
	(Insert Nam	Date:	8/7/10
			· · · · · · · · · · · · · · · · · · ·
Facility Licence No:	S	ource Licence No:	

1. Information on the Project or Facility

a) Describe below the proposed work and the normal operating procedures. Include as much detail as possible. If this request is a modification of an existing submission, clearly describe that modification.

The decommissioning work is described in the licence application documents included with this submission, principally the Decommissioning Plan AC-D-LA-7a and supporting documents.

The licence application is to decommission all the equipment and facilities involved in the previous manufacture of radiopharmaceuticals with the exception of those items that will be reused in the future 18 MeV research activities. These items are principally the vault area shielding walls, the services and the HVAC system including filtration.

The licence application itself covers all the equipment and facilities but the plan is to dismantle and remove the equipment in stages. The first stage planned for late 2010 is to dismantle and remove equipment to free up the vault, GMP area and other areas needed for the future 18 MeV research activities. This SAC submission and the supporting decommissioning safety assessments give the safety and environmental justification for this first stage.

The old SPECT production area including the hot cells and the iodine cell are not included in this first stage and will be decommissioned in a later stage. There will be a later SAC submission, safety assessment and other plans as appropriate to give the safety and environmental justification for this work.

Broadly the approach for this first stage is given below. Details are in the licence documents.

- Remove waste, clean and decontaminate areas to the extent possible prior to dismantling.
- Dismantle the main equipment as subassemblies where possible. This approach minimises the worker time in the radiation area and simplifies and makes safer the lifting and transport.
- Use a large crane placed outside the building to lift the cyclotron magnetic structure though the vault plug and secure on a truck.
- Transport the large load during the night to Lucas Heights.
- Unload the items in Hut 36 at Lucas Heights.
- Remove other items to a low doserate area and characterise to determine packaging requirements.
- Store the other items in the Camperdown building basement or SPECT beam room.
- b) List below attachments (eg drawings, work instructions, manuals, copies of licences, calculations, relevant email correspondence, survey reports) included with this submission.

The attachments to this SAC submission are listed below. These are the OHSE Category Determination Form, a detailed safety assessment in place of Appendix E, and the full suite of ARPANSA licence application documents, including the project decommissioning plan and schedule.

- OHSE Category Determination (AF-2322);
- Safety Assessment (ANSTO/T/TN/2010-9);
- Risk Assessment for Lifting Cyclotron from Vault;
- Supporting preliminary SWMS for the cyclotron work and the hot cells removal;
- ARPANSA Facility Licence Application NI (ARPANSA Document Id: RPB-LA-Form 240C);
- Effective Control Plan (Licence Application document AC-D-LA-E6a);
- Safety Management Plan (Licence Application document AC-D-LA-E6b);
- Radiation Protection Plan (AC-D-LA-E6c);
- Radioactive Waste Management Plan (AC-D-LA-E6d);
- Security Plan (AC-D-LA-E6e);
- Emergency Plan (AC-D-LA-E6f);
- Decommissioning Plan (AC-D-LA-E7a) which includes the schedule and the supporting characterisation information; and
- Lifting and Transport Plan from Toll Project Services.

2. Identification of Hazards

a) Indicate below the type of hazards expected in the process.

Biological		High or Low Pressure	
Chemical	\boxtimes	High or Low Temperature	
Confined Space		Ionising Radiation	\bowtie
Construction	\boxtimes	Manual Handling	\boxtimes
Cryogenics		Mechanical	\boxtimes
Dust		Noise	
Electrical	\boxtimes	Non-ionising Radiation (eg lasers, microwaves, UV)	
Environmental		Nuclear Safety	
Fire/Explosion		Radioactive Contamination	\boxtimes
Heights	\boxtimes		

3. Hazard Control Measures

The hazard control measures are included in the Safety Assessment ANSTO/T/TN/2010-9. Further information is given in the attached licence application documents, principally the Safety Management Plan (E6b), Radiation Protection Plan (E6c), Waste Management Plan (E6d) and Decommissioning Plan (E7a). The checked boxes below provide a summary only. Where further hazards are identified in detailed planning, the SWMS process will also develop controls.

a) Indicate below the controls on hazards that are in place during **normal** operating conditions of the plant or process. This will aid in the completion of Section 14 (via Appendix E). **Abnormal** hazardous conditions shall also be assessed in the risk ranking form (Appendix E) in Section 14.

Fume Cupboard		Lifting Equipment	\boxtimes
Extract Ventilation		Chemical Storage Facility	
Extract System with Filter		Spill Control	
Biohazard Cabinet		Leak Testing	
Glove Box		Insulation	
Hot Cell		Hazardous Area Equipment	
Shielding	\boxtimes	Earthed Equipment	
Gas Blanket		Work at Height Protection	\boxtimes
Fire Detection & Alarm		Respiratory Protection	\boxtimes
Gas Detection & Alarm		Skin Protection	\boxtimes
Fire Protection		Eye Protection	\boxtimes
Interlocks		Hearing Protection	\boxtimes
Machine Guarding		Administrative Procedures	\boxtimes

b) Give further details on the hazard controls in the box below. For example more fully describe any personal protective equipment being used: type of respiratory protection, glove material. Include indicators that the controls are functioning appropriately. These may include routine inspections, tests and maintenance on equipment. Examples of the latter may be: the fume cupboard inspection date; calibration regime for gas detectors.

The hazard controls are indicated above where there are ticked boxes. They are described in the licence application documents, principally the Safety Management Plan AC-D-LA-E6b and the Radiation Protection Plan AC-D-LA-E6c, and they are referred to in the Safety Assessment ANSTO/T/TN/2010-9.

c) Indicate below any monitoring performed in the plant or at the process.

Area Radiation Monitors	\boxtimes	Gas or Vapour Sampling	
Contamination Monitoring	\boxtimes	Particulate Sampling	
Environmental Monitoring		Liquid Sampling	

d) Give further details about the monitoring in the box below. Specific requirements for monitoring are given in the Radiation Protection Plan AC-D-LA-E6c.

4. Ionising Radiation

a) Does the work involve ionising radiation? ANSTO Business Management System: AF 2321 Approved by: Manager, OHSS on 11/3/10 Custodian: QSERP



Is radioactive contamination likely in this work?	Yes 🖂	No 🗌
If the answer to both questions 4 (a) and (b) was 'No', proceed to Pa	rt 6 of this form.	
If 'Yes' has been given to either question 4 (a) or 4 (b), complete the	Employee Data For	rm in
Appendix C.		·· –
Does this activity require licensing with ARPANSA?	Yes 🖂	No 🗌
Give reasons in the box below for <i>either</i> answer to question 4(e).		
This project involves decommissioning the ANSTO Camperdown ra	diopharmaceuticals	S V a al la ca
production facilities licensed as parts of ARPAINSA licence titled FU	044-5A, 5B, 5C ISSI	lea on
24/12/2002.		
Criticality		
Does the work involve fissile material (P_{11} 233 L or 235 L)?		No 🕅
If the answer to question 5 (a) was 'Yes' fill in the table below. Attac	tos th a conv of the curi	rent
certificate to this request for approval.		CIII
Criticality Certificate No:		
Date Certificate Issued:		
Date Certificate Valid to:		
Ultraviolet Radiation		
Does the work involve the use of ultraviolet radiation?	Yes	No 🖂
If 'No' has been given to question 6 (a) proceed to Part 7 of this form	 1.	
Does this activity require licensing with ARPANSA?	Yes	No
Give reasons in the box below for <i>either</i> answer to question 6(c).	_	
If the answer to question 6 (a) was 'Ves' attach a conv of the most ru	ecent LIV radiation (survov t
this request for approval		Survey
Microwave Radiation		
Does the work involve the use of microwaves?	Yes	No 🖂
If 'No' has been given to guestion 7 (a) proceed to Part 8 of this form	· · ·	
Does this activity require licensing with ARPANSA?	Yes 🗌	No 🗆
Give reasons in the box below for <i>either</i> answer to question 7(c).		
If the answer to question 7(a) was 'Yes', attach a copy of the most re	ecent microwave rac	diation
survey to this request for approval.		
Lasers		
Does the work involve the use of lasers?	Yes 🗌	No 🖂
If 'No' has been given to guestion 8 (a) proceed to Part 9 of this form		
If 'Yes' has been given to guestion 8 (a), complete the Laser Safety I	Form in Appendix D	
Does this activity require licensing with ARPANSA?	Yes	No 🖂
Give reasons in the box below for <i>either</i> answer to question 8(d).		
No lasers are used in the decommissioning.		
Plant and Equipment		
Does the work involve the use of pressure equipment?		No 🖂
Does the work involve the use of a boiler?		
Does the work involve the use of lifting equipment?		No [
If V_{0} has been given to either $Q(q)$ (b) or (c) fill in the table below		
	•	
The decommissioning will use lifting equipment including that itomis	ed in the table bold	w In
addition the major lifts through the vault roof will be with a large 400) tonne crane and th	
be further cranes used as part of the overall tasks of moving the lar	de componente to e	
storage at Lucas Heights. The planning for these major lifts and the	transport is heing o	done hv
an external specialist company. The cranes used will comply with a	Il safety and regulat	torv
requirements	in carety and regular	,
I EQUITETTETTS.		

Description of the Plant/Equipment being Used in this Process	Registration Number	Date Inspection is Valid To
Cyclotron Vault crane (room 0053) • SWL 400kg	Crane No. 174-81 Equipment No. HHC 161506.	Annual and PM 17/12/2009
Clayco goods hoist (lift to basement Adjacent to room 0020) • SWL 500kg	Lift - Goods Dumb Waiter Equipment No. HHC 106132	6 month plan 1/3/2010
Demag Crane (dispatch rail crane in room 0015 /0017 /0019) • SWL 800kg	Crane No. 188/81 Equipment No. HHC 161523	Annual and PM 17/12/2009

(Note: Rows can be added to this table as necessary)

10. Chemicals

a)	Does the work involve the use of dangerous goods or hazardous substance	es?	
		Yes 🖂	No 🗌
	If 'Yes' complete the 'Usage of Chemical Substances Form' in Appendix B.		
11.	Waste Generation		
a)	Will waste be generated during this process?	Yes 🖂	No 🗌
	If 'Yes' complete the Waste Generation Form in Appendix A.		
	The Waste Management Plan AC-D-LA-E6d included in this application de	scribes the wa	ste and
	how it is handled.		

12. Biological Hazards

Does the work involve?

a)	Dealings with genetically modified organisms	Yes 🗌	No 🖂
b)	Microorganisms (bacteria, viruses, fungi, algae, protozoans)	Yes 🗌	No 🖂
c)	Prions	Yes 🗌	No 🖂
d)	Non-microbial parasites	Yes 🗌	No 🖂
e)	Toxic molecules/toxins of biological origin	Yes 🗌	No 🖂
f)	Tissues, fluids, parts, or waste from humans or animals	Yes 🗌	No 🖂
g)	Live or dead animals	Yes 🗌	No 🖂
h)	Any other potentially infectious material	Yes 🗌	No 🖂

If "Yes" complete the Biological Hazard Assessment form.

13. Personnel Competencies

a) Indicate below the particular training or certification required in the process.

Safety Induction		Safe Working in a Confined Space	\boxtimes
Ionising Radiation	\boxtimes	Manual Handling	\boxtimes
Non-ionising Radiation		Lifting Equipment	\boxtimes
Chemical Safety		Personal Protective Equipment	\boxtimes
Cryogenic Safety		Construction Safety	\bowtie

b) If all personnel do not have the competencies indicated above, give reasons in the box below. (For example a process employs six individuals. A crane may be occasionally used in that process. While a dogman ticket is required by the person operating the crane, not all persons will need that ticket.) Contact the Safety Training Officer if you are unsure of the training that an individual has received.

Decommissioning in the active areas will be performed by ANSTO ECP and Waste Operation's staff. These staff are trained radiation workers, experienced in the types of activities. They will be under the control of the Works Coordinator supported by the Radiation Protection Advisor and the Cyclotron Engineer. If the Works Coordinator finds that a team member or members requires further training, this will be provided.

14. Risk Assessment

- a) Unless an alternative risk assessment has already been carried out (and is attached with this submission) for example a Safe Work Method & Environmental Statement complete the Hazard Identification and Risk Assessment Form in Appendix E. Consider both normal and abnormal conditions for the operation of the plant and process. The reference document for the completion of the form is "*Risk Management Risk Assessment Conduct of a Risk Study*". In filling out the form you should use the terminology of that reference.
- b) Describe the management actions deriving from any part of the risk assessment where the result has been 'Low', 'Intermediate' or 'High'.
 See the Decommissioning Safety Assessment ANSTO/T/TN/2010-9 included with this licence application. Further information on hazards and controls is given in the Risk Assessment for Lifting Cyclotron from the Vault and the preliminary SWMS for the cyclotron work and the hot cells removal.

15. Environmental Assessment

Complete the table below to identify activities that interact with the environment (environmental aspects) and have a potential to impact the environment. Your Local Environmental Coordinator should fill in the last column to determine whether the Aspect is 'Recordable'

Applies	Aspect	Comments (How used, how produced)	Quantity (estimate for this SAC)	Controls Measures taken to reduce impact	Recordable Aspect Reviewed by LEC
	Potable Water Use (Water supplied by Sydney Water)				
	Electricity Use (Especially 415V)	No significant power use during decommissioning.			
	Fuel Use (Petrol, Diesel, Gas)	No fuel used.			
	Paper & Packaging (Includes paper, cardboard, glass, metal, plastic)				
	Ground Water (Potential for non-radioactive contamination)	The diesel tank bunding is inadequate. This will be remedied during the ANSTO Camperdown new 18 MeV cyclotron project.			
	Airborne Emissions (Discharges of non radioactive gases/mists)	The ventilation / filtration systems will stay on during the decommissioning. The emissions will be minimal because there are no volatile radioactive materials and there are no grinding / cutting operations to cause airborne fumes / dusts.			
	Storm water generation (Activities changing storm water flows)				
	Effluent entering sinks and drains (Excluding kitchens, bathrooms etc)	None anticipated during the decommissioning			
	Are exemption(s) for effluent exceeded? Refer to AG 2071 on next page	☐ Yes ⊠ No			
	Dust Generation (Construction, crushing, grinding activities)	Minimal.			
	Cryogenics (Especially Helium and specialties)				
	Noise (Potential for noise transmission outside				

Applies	Aspect	Comments (How used, how produced)	Quantity (estimate for this SAC)	Controls Measures taken to reduce impact	Recordable Aspect Reviewed by LEC
	ANSTO boundaries)				
	Construction (Buildings, roads, fences)	The decommissioning involves a large crane lift and transport of a large load to Lucas Heights.			
	Carcinogenic & Ozone depleting substances See Mandatory Environmental Aspects AG 2072 on next page	There are some chemicals left from the operations period. Waste Operations are cleaning up all the rooms and any chemicals will be left under the control of the Cyclotron Engineer for the future research operation or removed.			

Reference Document

Environmental Exemptions for Enfuent (AG 2071)
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Mandatory Environmental Aspect(s) (AG 2072)

Recordable Environmental Aspects

If the answer to any of the questions a) to e) below is 'yes' then **attach** the completed Environmental Aspects Identification Record(s) (AF 2092) signed by the Local Environmental Coordinator.

a. Will the activity involve potential / actual emissions or waste with radioactivity levels that exceed the reference levels defined in Schedule 2 of the ARPANSA Regulations?

Yes 🗌 🛛 No 🖂

b. Is the Waste Generation Form in Appendix A of this application to be completed?

Yes 🛛 🛛 No 🗌

c. Is the Usage of Chemical Substances Form in Appendix B?

Yes 🖂	No 🗌
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There will be minor use of solvent for cleaning during the decommissioning.

d. Is the Use of Radionuclides Form in Appendix C of this application to be completed?

Yes 🖂	No 🗌
-------	------

e. Are any of the aspects identified in the previous table classed as "recordable"?

Yes 🛛 🛛 No 🗌

As noted in the previous table, the diesel tank bunding is inadequate and there is the potential for a leak . This will be remedied during the construction project for the new 18 MeV cyclotron.

Local Environmental Coordinator Review

I have reviewed the information provided in this request and:

- I am satisfied that the relevant environmental aspects and impacts are addressed;
- Applicable controls have been identified;
- Environmental aspects have been reviewed for inclusion in the Aspects Register;
- All supporting documentation has been attached.

Comments by LEC:		
Resiew by DiWaters - speci	aliste knowledge	1 6 6
· ape	ed identified exists in	daya sase -
Name of Local Environment Coordinator	Signature	Date
David Waters	D.J. Wales	8/7/2010

Appendix A

OHSE Approval - Waste Generation

The decommissioning will generate inactive and active solid waste. The work will be performed by ANSTO Waste Operations group who are experienced in these activities and the established procedures will be followed. The details of the activities, the waste generated and how it will be managed and disposed of is described in the Decommissioning Plan AC-D-LA-E7, Waste Management Plan AC-D-LA-E6d and the Characterisation Report which supports the plans.

a) Indicate below the type of waste being produced.

	Туре			Description of Wastes, Volumes,
Form	Radioactive	Chemical	Biological	Concentrations , Hazards
Solid	\square			
Liquid				
Gas/Vapour				
Mist				

b) Indicate below how the waste from the plant or process is disposed of.

Active Extract System
HEPA Filters
SIAM Filters
Inactive Extract System
Open Air

c) If radioactive waste is being generated, give details in the next table.

Radioisotope	Half Life	Activity (Insert Units)	Estimated Dose per Container	
See the attached W	Vaste Manageme	ent Plan AC-D-LA-E6d	_	
Note: Down can be added to this table as research.				

(Note: Rows can be added to this table as necessary)

 d) Will the waste be handled as part of normal low level solid waste pick-up or "B" line liquid disposal? If not, or there are any different/unusual characteristics of the waste then contact Waste Management to assess requirements and, if necessary, to obtain Waste Reference Number.

Waste Management Reference No:

e) Give below any additional information relevant to the waste management process, (eg special handling requirements or packaging).

See the attached Waste Management Plan AC-D-LA-E6d

f) Will the waste be disposed of by means other than through Waste Management Section?

Yes 🗌 🛛 No 🖂

g) If 'Yes' describe below:

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Appendix B

OHSE Approval - Usage of Chemical Substances

List in the table below all compounds handled in the process that are classed as either a "Hazardous Substance" according to the NOHSC (National Occupational Health & Safety Commission) criteria and/or a "Dangerous Good" according to the ADG (Australian Dangerous Goods) Code. This information may be obtained either from the manufacturer's MSDS (Material Safety Data Sheet) or from the summary page of the Chemwatch Database found on the ANSTO CD Server. *Chemical Safety Standard and Practices* provides a further resource in the promotion of safe handling, storage and disposal of hazardous compounds.

Approximate Quantity being used per month
4 L (for cleaning)

(Note: Rows can be added to this table as necessary)

Appendix C

OHSE Approval - Use of Radionuclides

a) Provide below information on the personnel participating in this process.

The staff working in the active areas will be trained radiation workers. The Radiation Protection Adviser will set dose limits for the work which will limit times if necessary. This is described in the Radiation Protection Plan. The staff names will be on dosimetry records.

Employee No.	Name	Time in Area (hours/month)

(Note: Rows can be added to this table as necessary)

b) Provide below information on each radionuclide being used in the process.

There are no radionuclides being used in the decommissioning and the controlled materials have decayed.

The decommissioning will involve radionuclides:

- The equipment and areas will be decontaminated. This decontamination will be longer lived loose material from the activated surfaces and equipment.
- Some of the components to be removed are activated.

For the nuclides involved see the Characterisation Report.

Radionuclide(s)	Half- life	Physical Form	Chemical Form	Levels of Activity Handled/Month	Type of Containment and/or Shielding

(Note: Rows can be added to this table as necessary)

Appendix D

OHSE Approval - Lasers

Manufacturer	
Model	
Serial No.	
Class	

b) Description of the laser

a)

Continuous Wave	Visible	
Pulsed	Infrared	
Ultraviolet		

c) Fill in below the applicable values for the laser.

Quantity	Value
Output Power (P)	W
Wavelength (λ)	nm
Repetition Frequency (F)	hz
Energy per Pulse (Q)	J
Pulse Duration (t)	S
Total exposure time (T)	
(For visible lasers exposure time is limited by blink reflex: 0.25 s. If exposure time is not known typical approximate time is 10 s.)	S
Beam Divergence (ϕ)	Rad
Beam Diameter (a)	m
Cross Sectional Beam Area	m²
Radiant Exposure (H)	Jm⁻²
Irradiance Exposure (E)	Wm ⁻²
MPE _{ocular} : if E or H > MPE _{ocular} then the conditions are unsafe. (References: Continuous Wave Output Laser - AS/NZS2211.1, Table 7; Pulsed Output Laser - AS/NZS 2211 Supplement 1, Flowchart 3.	
MPE _{skin} : if E or H > MPE _{ocular} then the conditions are unsafe. (References: Continuous Wave Output Laser - AS/NZS2211.1, Table 8; Pulsed Output Laser - AS/NZS 2211 Supplement 1, Flowchart 3.	
NOHD (To be calculated for open air lasers) (References: AS/NZS 2211.1 Appendix A5; Continuous Wave Output Laser - AS/NZS 2211.1 Supplement 1, Flowchart 1; Pulsed Output Laser - AS/NZS 2211.1 Supplement 1, Flowchart 2.	
Diffuse Reflection (References: AS/NZS 2211.1 Appendix A3; AS/NZS 2211.1 Supplement 1, Flowchart 4.)	
Eye Protection Optical Density (D_L) (References: AS/NZS 2211.1 Section 12; AS/NZS 2211.1 Supplement 1, Section 8.4)	
 Definitions: MPE: Maximum Permissible Exposure. Maximum laser radiation levels to which the eye or skin can be exposed without consequential injury immediately or after a long time. NOHD: Nominal Ocular Hazard Area. The area within which the beam irradiance or radiant exposure exceeds the MPE_{ocular}. Refer to AS/NZS2211.1 for a full list of definitions. 	

d) Describe below the controls proposed to prevent exposure to damaging laser radiation. Refer to AS/NZS2211.1, Section 12.

Control	Description
Prevent continuous direct beam viewing	
Beam stops installed	
Beam path not located at eye level	
Staff excluded from beam paths where E or H> MPE*	
Specular reflection is controlled*	
Eye protection is available*	
Laser Warning signs posted on entrances*	
Beam paths enclosed*	
Interlocks*	
Remote control operation*	
Screens in place*	
Alignment checked*	
Key control*	
Other	
*Only for Class 3B and 4 lasers	

Appendix E

OHSE Approval - Hazard Identification and Risk Assessment Form

See the Decommissioning Safety Assessment and supporting safety assessments included with this application for the hazard identification and risk assessment.

 Scenario	Mitigations	Consequence Type	Consequence	Consequence Score	Likelihood Score	Risk	Acceptability

(Note: Rows can be added to this table as necessary)