environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

GENERIC APPLICATION FORM FOR A COASTAL WATERS DISCHARGE PERMIT IN TERMS OF SECTION 69 OF THE INTEGRATED COASTAL MANAGEMENT (ICM) ACT, (ACT NO. 24 OF 2008) effective from 01 January 2014

APPLICATION REFERENCE NO.: 2012/011/WC/KOEBERG POWER STATION

GENERAL INSTRUCTIONS

i. All relevant sections of this Application Form **must** be completed in full.

ii. If an item is "not applicable", please indicate "*N/A*". The use of "not applicable" in the Application Form must be done with circumspection.

iii. Failure to fully complete all required parts of this application form or pay necessary Application Fees (if required) will result in the application being returned.

iv. This Application Form **must** be completed and signed by the applicant. If the application is completed by a third party (such as a consultant or legal representative), the third party's details must further be included.

v. All details of previous approved licenses such as the reference number (s) and the dates of issue as well as expiration dates must be provided.

vi. This Application Form is current as of 1 January 2014. It is the responsibility of the Applicant to ascertain whether subsequent versions of the Application Form have been published or produced by the Department. Note that this Application Form replaces all the previous versions. This updated Application Form must be used.

vii. One hard copy and one electronic copy (CD/DVD/ via E-mail) of this form must be submitted.

viii. The required information must be typed within the spaces provided. The sizes of the spaces provided are not necessarily indicative of the amount of information to be provided. The space provided extend as each space is filled with typing. A legible font type and size must be used when completing the form. The font size should not be smaller than 10pt (e.g. Arial Narrow). A digital copy of the Application Form is available on request.

ix. No faxed or e-mailed applications will be accepted.

x. Unless protected by law, all information contained in and attached to this Application Form will become public information on receipt by the Department. Upon request, any Interested and Affected Party should be provided with the information contained in and attached to this Application Form.

xi. This Application Form must be submitted to the Department at the postal or physical address given below. Unnecessary delays will be incurred should the application and attached information not be submitted to the correct address.

xii. This Application Form, with all applicable documents **must** be addressed and sent to the Department of Environmental Affairs: Branch Oceans and Coasts to the **Director: Coastal Pollution Management** to:

2nd Floor, East Pier Building, East Pier Road, V & A Waterfront, Cape Town *or*
P.O. Box 52126, V & A Waterfront, 8002

Electronic submissions may also be sent to: cwdp@environment.gov.za

xiii. The proof of payment of the application fee must be attached to this application.

xiv. A copy of this application must be kept for the applicant's record.

xv. The Department's "Draft Generic Assessment Criteria" must be consulted for guidance on how the generic assessment criteria will be used to evaluate your application.

xvi. The Department's ***"Guideline on public participation requirements for Coastal Waters Discharge Permit Application under section 69 of the National Environmental Management Act: Integrated Coastal Management Act 2008 (Act no.24 of 2008)"*** *must be consulted for guidance when conducting public participation for a CWDP.*

xvii. For information or enquiries, please contact the following officials:
Mr M. Tshikotshi on 021 819 2455 or via E-mail mtshikot@environment.gov.za
Ms N. Baijnath-Pillay on 021 819 2409 or via E-mail nbpillay@environment.gov.za

SPECIFIC INSTRUCTIONS

Who must apply for a Coastal Waters Discharge Permit (CWDP)?

Anyone who discharges or intends to discharge land-derived effluent into the coastal waters of South Africa must apply for a CWDP.

Section 69 (1) of the ICM Act states:

"No person may discharge effluent that originates from a source on land into coastal waters except in terms of a general authorisation ... or a coastal waters discharge permit ..."

Under the ICM Act, **"effluent"** is defined as:

(a) Any liquid discharged into the coastal environment as waste, and includes any substance dissolved or suspended in the liquid; or

(b) Liquid which is a different temperature from the body of water into which it is being discharged.

"Waste" is similarly defined in the ICM Act as:

"... any substance, whether or not that substance can be re-used, recycled or recovered –

(i) that is surplus, unwanted, rejected, discharged, abandoned or disposed of;

(ii) that the generator has no further use of, for the purposes of production, reprocessing or consumption; and

(iii) that is discharged or deposited in a manner that may detrimentally impact on the environment."

Sections A, B, and C

I. Section A: To be completed by a private entity.

II. Section B: To be completed by a consultant and acting on behalf of the applicant.

III. Section C: To be completed by organ of state or operating as a parastatal.

- Complete all relevant fields.
- If you are a private individual and have been contracted as a service provider for the purposes of environmental authorisations and monitoring, please complete sections A and B respectively.
- If you are representing an organ of state/government/parastatal and have contracted a service provider for the purposes of environmental authorisations and monitoring, please complete sections B and C respectively.

ABBREVIATIONS

AADQ	Annual Authorised Discharge Quantity
ATE	Condensate Polishing Plant System
BAT	Best Available Technology/Technique
CRF	Circulating Water System
CTE	Circulating Water Treatment Plant System
CVI	Condenser Vacuum System
CWDP	Coastal Waters Discharge Permit
DWS	Department of Water Affairs and Sanitation
ETA	Ethanolamine
KER	Radiological Effluent Monitoring and Discharge System
KNPS	Koeberg Nuclear Power Station
KCWIB	Koeberg Cooling Water Intake Basin
KCWOB	Koeberg Cooling Water Outfall Basin
m^3	Meters cubed
m^3/a	Meters cubed per annum
MW	Megawatt
NEMA	National Environmental Management Act, Act No. 107 of 1998, as amended
NEM:ICMA	National Environmental Management Act: Integrated Coastal Management Act, Act No. 24 of 2008
NNR	National Nuclear Regulator
NNRA	National Nuclear Regulatory Act, Act No. 47 of 1999
PRDW	PRDW Africa (Pty) Ltd (Consulting Port and Coastal Engineers)
PWR	Pressurised Water Reactor
RCV	Chemical and Volume Control System
SDA	Demineralised Water Production Plant
SDX	Chemical Effluents System
SEC	Essential Service Water System
SED	Demineralised Water Distribution System (Nuclear Island)
SEK	Secondary Releases System (also knowns as the Conventional Island Liquid Waste Monitoring and Discharge System)
SEO	Storm Water System
SER	Demineralised Water Distribution System (Conventional Island)
SEU	Domestic Waste Water Treatment System
SRO	Ground Water Reverse Osmosis Plant System
SSRP	Safety Standards and Regulatory Practices

SWRO	Sea Water Reverse Osmosis Plant
WANO	World Association of Nuclear Operators
WWTW	Waste Water Treatment Works

Application Information

i. Existing discharge: ☐ New Application: ☐ Renewal Application: ☐

Revision/Amendment of Existing CWDP Permit: ☐

ii. Discharge into which of the following receiving environments:

Offshore: ☐ Surf Zone: ☐ Estuary: ☐

(For estuary discharges, applications will be processed in consultation with the relevant Department of Water Affairs Office)

SECTION A APPLICANT INFORMATION (PRIVATE)

Company trading name (if any):	Not Applicable – Applicant (Eskom) is a Parastatal (refer to Section C).		
Registration no:			
Contact person:			
Physical address:			
Postal address:			
Postal code:		Cell:	
Telephone:		Fax:	
E-mail:			
Website:			

If the applicant is an individual please provide South African identification number or alternatively provide a valid Passport Number: ___N/A_____

Pipeline owner:	Not Applicable – discharge is not via an offshore pipeline.		
Contact person:			
Postal address:			
Postal code:			
Telephone:		Cell:	
E-mail:		Fax:	

NB: If another company also discharges via this outfall, kindly attach a list of details as requested in all sections of this application form for any such company.

SECTION B APPLICANT INFORMATION (CONSULTANT)

Consultancy Trading Name:	WorleyParsons RSA (Pty) Ltd, trading as Advisian		
Registration no:	1989/002048/07		
Consultants name:	Mrs Kim Pontac		
Designation:	Senior Environmental Consultant		
Physical address:	31 Allen Drive, Loevenstein, Bellville		
Postal address:	PO Box 398, Bellville, 7535		
Postal code:	7530	Cell:	082 410 0998
Telephone:	021 912 3000	Fax:	021 912 3222
E-mail:	Kim.pontac@advisian.com		
Website:	www.advisian.com		

SECTION C APPLICANT INFORMATION (ORGAN OF STATE OR PARASTAL)

1. Name of District or Local Authority:
   ____Eskom Holdings SOC Limited_____

2. Department:
   ____Koeberg Nuclear Power Station _____

3. Directorate/Section:
   ____Environmental Management _____

4. Primary Contact Official:

Name & Surname:	**Mr Deon Jeannes**		
Designation/Rank:	**Nuclear Environmental Manager**		
Physical address:	**Bulk Stores Complex, Koeberg Nuclear Power Station, R27 off West Coast Road, Melkbosstrand**		
Postal code	**7441**		
Telephone:	**021 550 5027**	Cell:	**071 897 9729**
E-mail:	**Deon.jeannes@eskom.co.za**	Fax:	**086 665 4414**
Website:	**www.eskom.co.za**		

5. Secondary Contact official:

Name & Surname:	**Mr Moegamat Riedewaan Bakardien**		
Designation/Rank:	**Nuclear Engineering Manager**		
Physical address:	**Koeberg Nuclear Power Station, R27 off West Coast Road, Melkbosstrand**		
Postal code	**7441**		
Telephone:	**021 550 4355**	Cell:	
E-mail:	**Riedewaan.Bakardien@eskom.co.za**	Fax:	**021 550 4337**
Website:	**www.eskom.co.za**		

SECTION D EFFLUENT GENERATION

1. Provide a brief description of the effluent discharge process that results in the effluent being generated, together with the products, by-products and other waste per month. Attach an effluent flow chart.

Koeberg Nuclear Power Station (KNPS) is located approximately 30 km north of Cape Town, near Melkbosstrand on the West Coast of South Africa. This CWDP application is for the discharge of cooling water, industrial and domestic effluent generated at the power station, via the existing Koeberg Cooling Water Outfall Basin (KCWOB) located at the south-western portion of the site boundary.

The main waste streams of the effluent discharged are the following:

- **Returned abstracted water**. The operation of KNPS, a Pressurised Water Reactor (PWR), requires large volumes (~80 m^3/s) of cooling water to condense steam used by the turbines that generate electricity for export to the national grid. Cooling water is drawn from the Atlantic Ocean, passed through the condensers and then returned to the sea with a temperature above that abstracted; approximately 11°C above ambient sea water temperature. The cooling water waste stream, which is generated from cooling the turbine steam and turbine auxiliaries (secondary circuit), is referred to as the Circulating Water Circuit (CRF). The second cooling water waste stream, which cools the Nuclear Island (primary circuit and auxiliaries), is referred to as the Essential Service Water System (SEC).

In addition to the heat transfer, the cooling water returned to sea may also contain residual oxidants arising from chlorination. KNPS doses incoming water with chlorine to mitigate the build-up of biofouling within the cooling systems.

In addition to the cooling water discharge, effluent produced as a result of normal operation of KNPS (e.g. process effluent and domestic effluent) is also discharged via the KCWOB. The main waste streams of the effluent discharged are:

- **Industrial effluent** produced from the primary and secondary circuits. This waste stream comprises chemical effluents and contains radiological contaminants. Please note that radioactive contaminants are abated at source via various treatment systems employed at KNPS. The treatment systems are designed to reduce radioactivity from the primary circuit effluent prior to discharge with the cooling water. The radioactivity release limits are set by the National Nuclear Regulator (NNR).
- **Oily water process effluent**. This waste stream comprises water potentially contaminated with oil from working areas where hydrocarbons are used (the source may be from the turbine hall and general plant operations). The operational practice dictates the waste water is directed to an oil skimmer or weir that is used to filter off all the oil, after which the resulting effluent is discharged with the cooling water. The remaining oil fraction that has been separated is sent for final disposal at an appropriately licenced waste management facility.
- **Demineralised and potable water production process effluent**. This effluent is generated from demineralising potable water (received from the City of Cape Town or from a reverse osmosis plant) for use in process operations. The effluent generated, which is characterised by high or low pH is treated by neutralisation using acids and alkalis before being discharged with the cooling water. The power station also has a reverse-osmosis plant for desalination purposes, as an alternative water supply to the demineraliser water production plant. This plant is currently no longer in use but will be replaced with a newer plant in the future.
- **Domestic effluent**. This waste stream comprises of grey water from showers and laundry and black water from sewage. Wastewater is then treated at the on-site Waste Water Treatment Plant (WWTW) before being discharged with the cooling water.
- **Sea water desalination plant effluent**. A sea water reverse osmosis plant is proposed to augment the City's potable water supply. The effluent generated is mainly in the form of brine and the various chemicals associated with a SWRO plant.

In addition to the thermal exchange a number of chemical contaminants may be included in the cooling water discharge which includes:

- Ammonia;
- Ethanolamine;
- Hydrazine;
- Chlorine and chlorine by-products;
- Boron; and
- Phosphate.

Ammonia, phosphate, hydrazine and ethanolamine are used to condition circuits to prevent corrosion, whereas boron is used to control reactivity in the reactor. Chlorine is used to prevent biofouling of open cooling systems.

Please refer to the Coastal Water Discharge Permit Technical Report (Annexure A) for further detail pertaining to the generation of the effluent discharge. Refer to Figure 1 for a schematic diagram of KNPS liquid release systems.

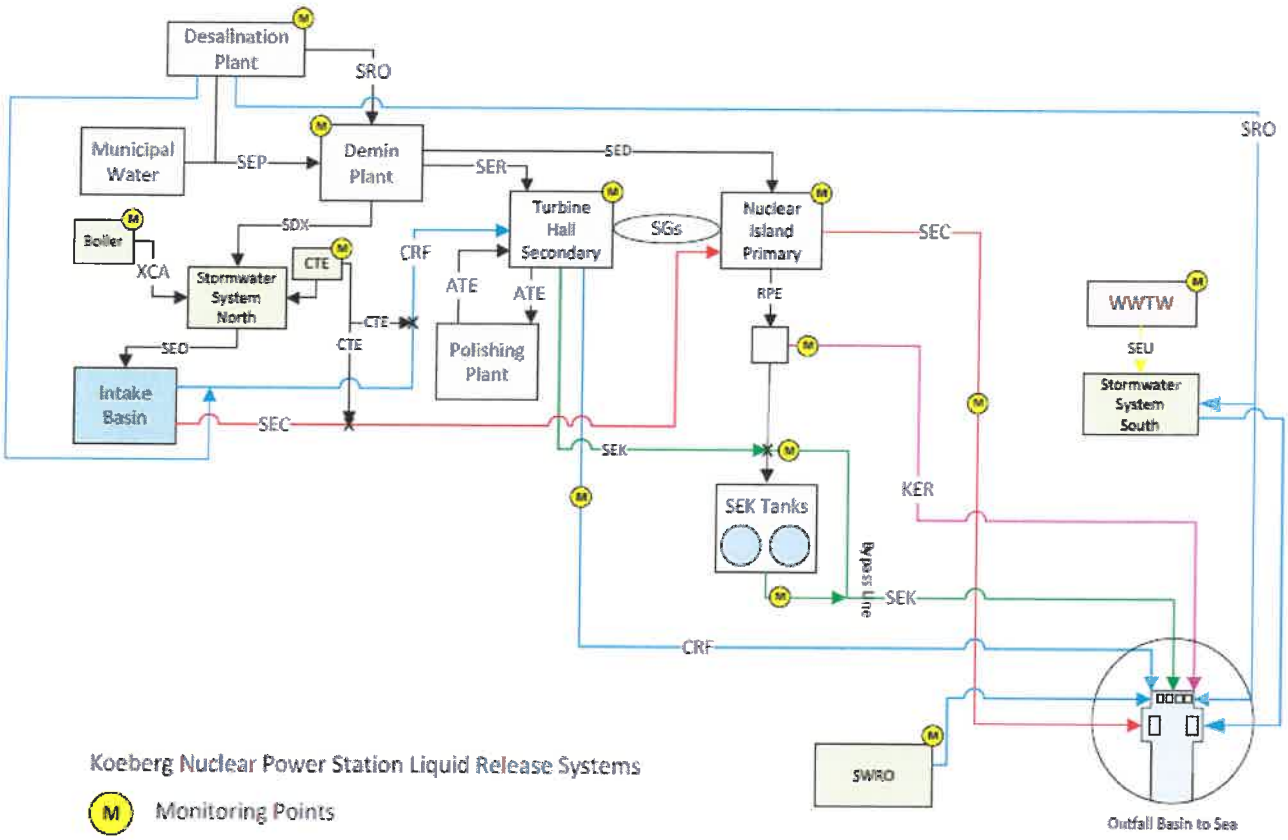

Figure 1: Schematic Flow Diagram of Koeberg Nuclear Power Station Liquid Release Systems.

2. Describe the location of the waste generation points as within the facility, the route to the coast, the discharge point and the structures associated with the activity en route to the discharge point.

KNPS has a discharge point located in the Koeberg Cooling Water Intake Basin (KCWIB). This discharge point is mainly used for the draining of storm-water collected from the northern half of the plant (i.e. storm-water - northern side (SEO-N) system). However, there are some industrial systems which discharge treated effluent via the SEO-N system into the KCWIB. The discharge volume from this point is not considered significant, due to the large volume of water abstracted within the basin by the CRF and SEC cooling water pumps which ensures that the effluent is ultimately "re-used" in the plant by passing back through the cooling water system and effectively discharging within the KCWOB (PRDW, 2016).

The key systems and processes of KNPS with relation to effluent production and discharge are:

1. The Main Circulating Water Circuit (CRF)

The CRF system's main purpose is to cool the main turbine condenser (within the turbine hall) and remove latent heat of condensation, which cannot be utilised. The cooling system is an open system, which refers to circulating water that is directly drawn from and discharged back into the sea. The cooling system is independent of the primary and secondary systems.

The circulating water, abstracted from the KCWIB, passes through a filtration system and the pumping station and is then split into three streams. The main stream enters the turbine condenser and the two smaller streams are used to supply the Component Cooling System (Conventional Island) heat exchangers and the Condenser Vacuum System (CVI) vacuum pump heat exchangers. The cooling water is supplied at ambient seawater temperature. The water cools the turbine condenser and above heat exchangers and is discharged through pipes back into the sea at the KCWOB.

The CRF system outflow pipes enter the KCWOB in a concrete housing at the northern end of the outlet structure. The condenser cooling water for each unit is discharged into the outlet through two 3 m diameter pipes, therefore a total of four CRF outlet pipes dispense within the KCWOB. A 3 m high weir, as well as a number of structural and flow stabilising baffles are located in front of the pipes.

2. The Essential Service Water System (SEC)

Similar to the CRF system, the SEC system is an open cooling water system using sea water for cooling but fulfils a safety function within the Nuclear Island as an ultimate heat sink. SEC forms part of the cooling system provided to transfer heat from systems important to safety, under normal operating and accident conditions.

The cooling system is independent of the primary and secondary systems. The intake water is abstracted from the KCWIB and is passed through a filtration system and then pumped to the nuclear auxiliary building. In exceptional circumstances, SEC water may be drawn from the CRF, via an inter-unit and inter-train common header, connected to the downstream side of the three CRF intake filters on both units. The SEC-CRF inter-connector is kept in dry lay-up and may only be used with the unit shutdown.

The SEC system outflow enters the KCWOB through a baffled anti-splash chamber on the north-western side of the outlet structure. Prior to this, the SEC discharge flows via an open channel from the Nuclear Island.

3. The Secondary Releases System (SEK)

The SEK system is the receiving system of any discharge from the secondary system and in exceptional circumstances from the Nuclear Island effluent system (KER). During normal operations the SEK discharge bypasses the SEK tanks. In exceptional circumstances, when the radioactivity levels are deemed too high for bypass mode, the SEK discharge is diverted to the SEK holding tanks (x2). The control room operator is alerted to this condition, and the liquid waste is then monitored and measured. Discharge from the SEK holding tanks are only authorised once the

cause of the abnormal condition is remedied, and the release dispensed in batches to ensure further dilution with the cooling water discharge.

The SEK system (bypass mode or from the SEK holding tanks) discharges effluent directly into the CRF outlet through a piping system in the CRF outlet water box structure.

4. Radiological Effluent Discharge System (KER)

The KER system measures volume and monitors the radioactivity of liquid effluent discharged from the Nuclear Island. The concentration released to the environment depends on the level of radioactivity of the effluent (which is a function of the NNR regulatory standards) and the dilution capacity of the cooling water. The KER effluent is discharged into the CRF outlet through a piping system in the CRF outlet water box structure. As mentioned, this effluent contains radioactive contaminants which is minimised at source via various abatement techniques at KNPS. The treatment systems are designed, depending on their specific function, to remove radioactive contaminants from the primary circuit and effluent prior to discharge.

5. The Demineralised Water Production Plant (SDA), Ground Water Reverse Osmosis Plant (SRO) and Polishing Plant System (ATE)

The purpose of the SDA system is to produce demineralised water for the primary and secondary systems. Chemicals are added to the demineralised water to condition systems to prevent corrosion. Downstream of the SDA system (still within the demineraliser plant) are the demineralised water production plant sumps (SDX) that are used to remove effluent from the SDA plant and that discharges to KCWIB via the SEO system. The chemical constituents used in the SDA and SDX systems are as follows:

- Sulphuric acid and sodium hydroxide are used within the SDA system to regenerate ion exchange media and after neutralisation generates quantities of sulphate and sodium as effluent in the SDX system; and
- Aluminium sulphate is injected as a flocculent prior to this SDA filters. The effluent produced from this system consists of filter backwashing, aluminium and solids concentrated from the potable water feed.

The SDA system can be supplied by municipal water or from a ground water desalination/ reverse osmosis plant (SRO). The reverse osmosis plant effluent is described in section 4.3.1 the Coastal Water Discharge Permit Technical Report (Annexure A).

The purpose of the ATE system is the control of the steam generator's feed-water chemistry, and the removal and control of sodium in the secondary circuit.

Chemical treatment of the steam generator feed-water is intended to limit corrosion and deposits on the surfaces of the steam generator tubes. This prevents damage to secondary system components, loss of heat transfer in the steam generators and steam generator tube leaks.

The secondary side chemistry makes use of the following chemicals, for control purposes:

- Hydrazine is used as an oxygen scavenger; it also contributes to pH control;
- Ammonia is used as a pH controller, during condenser tube leak conditions and plant start-up; and.
- Ethanolamine (ETA) is used as a pH controller during normal operations with no condenser tube leaks.

ETA injection is removed from service during condenser tube leaks because it is injected into the system at a different point to that of Ammonia and therefore does not have the same effect. ETA also provides flow assisted corrosion protection.

During normal operations, the discharge from the ATE system is recirculated back into the plant and reused. However, during abnormal conditions (e.g. the draining and flushing of the plant) the system discharges clean water into the outfall via the SEK system.

6. The Waste Water Treatment System (SEU) and Storm-water System (SEO)

KNPS has an established sewer network which comprises of gravity flow lines leading to a central sump. The majority of the sewage is pumped from the main sump to the local municipal Melkbosstrand sewage treatment plant; however, a small volume (as per the permit) is treated on-site in an activated sludge process plant. The final effluent is further sanitised with chlorine prior to its discharge into the outfall, via the SEO system. The SEO system discharges into the KCWOB through a baffled anti-splash chamber on the south-eastern side of the outlet structure. The SEU system only receives domestic effluent and no industrial effluent.

7. Sea Water Desalination Plant

The City of Cape Town has proposed a SWRO plant at Koeberg. The brine and other associated effluent from the plant, if approved and implemented will discharge into the CRF outfall.

Please refer to chapter 4.3.5 of the Coastal Water Discharge Permit Technical Report (Annexure A) for further detail.

Refer to Figure 1 for a schematic diagram of KNPS liquid release systems.

---

3. In order to further assess the application, please indicate the type of sector generating the effluent. (Make an X in the appropriate box)

a.	Aquaculture	
b.	Industrial	X
c.	Brine or brackish water	X
d.	Cooling water	X
e.	Fish processing effluent	
f.	Municipal Effluent / **Domestic effluent**	X
g.	Other (please specify below)	

Services Development Plan, in terms of the Water Services Act (Act No. 108 of 1997), must be submitted with regard to water management for the Municipality

Not Applicable

SECTION E ALTERNATIVES AND RATIONALE FOR THE DISCHARGE OF EFFLUENT

1. Do alternatives exist other than to discharge the effluent into the coastal environment? YES / NO
2. If alternatives to discharge exist, please provide details:

Alternatives to coastal discharge do exist however these were not deemed environmentally, technically or financially feasible. See rationale below.

---

3. If not, provide a strong motivation for the need and desirability of the effluent discharge into the coastal environment, noting the need to consider the best practicable environmental option for the site:

The historic background of this application should be taken into consideration. KNPS has been in commercial operation since 1983. The disposal of land-derived effluent into coastal waters was previously authorised by the Department of Water Affairs and Forestry (now the Department of Water and Sanitation – DWS) under the Water Act, 1956, 54 of 1956, and this water use is an existing lawful use in terms of the National Water Act, 36 of 1998 (NWA).

With the promulgation of the National Environmental Management: Integrated Coastal Management Act, 24 of 2008 (NEM:ICMA), the administrative duties in terms of marine discharges has been transferred from the NWA to the NEM:ICMA, and as such a Coastal Waters Discharge Permit (CWDP) is required by KNPS. It is understood that the intention of the CWDP is to replace the marine discharge requirements that exist under the NWA; however the discharge operations at KNPS have been in compliance with the existing water permit and exemption recognised by the NWA, and cognisance of this should be taken into consideration by the DEA (competent authority in terms of the NEM:ICMA).

In response to the question, disposal options which avoid the need to discharge effluent to the coastal environment are limited due to the volume of waste water generated by the cooling water systems (CRF and SEC) and the chemical composition of the water. The large volume of cooling water abstracted from the sea is very saline and is not suitable for discharge into a water resource or a municipal WWTW.

Many of the effluent streams, such as those discharged via SEK and KER, contain residual radioactivity after treatment. In order to minimise radioactive dose to members of public, workers and plants and animals it is desirable to rather discharge the effluent mixed with the CRF and SEC cooling water and discharge into the sea, than to discharge into a water resource or WWTW or re-use the treated effluent. An alternative approach would require more expensive effluent treatment processes which is not considered best practise given the low volumes of effluent discharged. Some of the higher quality, radioactive effluent is treated in the boron recycle system evaporators and this can allow condensate and/or boron (concentrate) to be re-used. The re-use of distillate has the major downside of resulting in higher tritium levels in the spent fuel pools which will result in higher public and worker dose. Concentrate is already re-used at KNPS but is limited due to the increased worker dose and silica levels due to the concentration of radionuclides and impurities in the concentrate.

Approximately eighty percent (80%) of the domestic effluent generated on site is discharged to the local municipal sewage works (Melkbosstrand). The other twenty percent (20%), <100 m^3/day, is treated on-site by means of activated sludge treatment, before discharge into the sea.

The demineraliser plant effluent stream is either saline or consists of concentrated waste products and it is not best practise to re-use or discharge to a water resource or municipal WWTW.

In-situ disposal method options include the treatment of effluent at KNPS WWTW and final discharge via irrigation on the property. However; this would require the existing WWTW design capacity be upgraded (x 11 000) to accommodate effluent volumes, and in addition a desalination plant be constructed to remove the salt content of the water for irrigation purposes. Based on the above reasoning these options to avoid the discharge to the coastal environment would be prohibitively expensive and unreasonable taking into consideration the remaining lifespan of the plant.

The processes and technology currently implemented at KNPS are considered the most appropriate pollution control measures and the application of best available technique (BAT) for water discharge activities in the nuclear industry. Nevertheless, Eskom will review its hydrazine and chlorine practices to determine if it is feasible to further minimise the release.

Refer to chapter 5 and 7 of the Coastal Water Discharge Permit Technical Report (Annexure A) for further detail.

4. Provide details of measures that are/will be made for effluent avoidance/prevention, waste minimisation, recycling, etc.

As discussed in Section E.3 above, KNPS has various liquid processing systems, each of which has its own features which minimise or reduce emissions and their associated impacts. These have been separated accordingly and discussed below.

The following measures have been implemented to minimise emissions and their associated impacts caused by the Nuclear Island process effluent streams:

- The water within the pressurised primary cooling circuit is re-used; this is possible due to the closed system and the recycling of water from the reactor Chemical and Volume Control system (RCV). This system minimises water consumption and the generation of effluent. The recycling system also reduces consumption of boric acid, thereby minimising mass emissions of boron;
- The water in the primary cooling circuit is dosed with chemicals which prevent corrosion of the plant and therefore minimises emissions of radioactive and non-radioactive metals;
- Effluent streams on the Nuclear Island are managed by separating waste streams according to quality and radioactivity prior to and after treatment; and
- Treatment of effluents from the Nuclear Island is optimised according to their source to remove radioactive contaminants, which in turn also removes non-radiological contaminants such as boron.

The following measures have been implemented to minimise emissions and their associated impacts caused by the Steam Generator Blowdown process effluent streams:

- The water within the secondary circuit is used in a closed system. The Steam Generator Blowdown System maximises the use of this water, which minimises water consumption and the generation of effluent;
- The water in the secondary circuit is dosed with chemicals which prevent corrosion of the plant and therefore minimises emissions of non-radioactive metals;
- The Steam Generator Blowdown is treated using filtration and demineralisation to maximise recycling of water to the secondary circuit and also produces a high quality effluent stream;
- The Steam Generator Blowdown effluent may be contaminated with small amounts of radioactivity but this is reduced by the ion exchange resin system in service; and
- The secondary steam system is dosed with chemicals to control pH, which helps to prevent corrosion of the plant.

The following measures have been implemented to minimise emissions and their associated impacts caused by the oily water industrial effluent streams:

- Oily water will pass through an oil-water separator before being discharged. An oil trap is located on the turbine building waste streams and also the storm water from buildings which may have oil contamination have oil traps prior to discharge into the storm water system.

The following measures have been implemented to minimise emissions and their associated impacts caused by the domestic effluent stream:

- Approximately eighty percent of domestic effluent is discharged to the municipal waste water treatment facility (Melkbosstrand). The remaining twenty percent is treated by an activated sludge treatment system (primary and secondary treatment) with sanitation (chlorine).
- Detergents used by the laundry systems are using biodegradable surfactants and no phosphates to minimise environmental impacts.

The following measures have been implemented to minimise emissions and their associated impacts caused by the cooling water effluent streams:

- Appropriate monitoring, control and maintenance systems to ensure that the plant operates effectively.

5. Has any of the activities in the Listing Notices of the Environmental Impact Assessment Regulations (2017), in terms of Chapter 5 of the National Environmental Management Act, 1998 (Act No. 107 of 1998), been triggered that will result in the discharge to the coastal environment? YES NO

All of the effluent streams are existing effluent streams and therefore no EIA is required, with the exception of the CoCT proposed SWRO plant. Though, it is anticipated that the SWRO installation will be considered as an emergency situation in terms of NEMA, due to the current drought. This is subject to finalisation and further deliberation with the various competent authorities.

6. If YES, has the abovementioned assessment been conducted? YES NO

Further to the above, there is currently no formal position on if an EIA will or will not be a requirement for the CoCT SWRO plant.

NOTE: *that a public participation process is required before a CWDP may be authorised. If the answer to question 6 is "NO," please be informed that the CWDP Reference Number as well as the associated documentation pertaining to this application may be used in the public participation process for an Environmental Authorisation to avoid duplication of such a process.*

7. Environmental Authorisation Reference Number (if YES):

Not Applicable (see above).

(Attach approved Environmental Authorisation)

8. Date of commencement of pipeline operation

Discharge is via a concrete outfall and not via a pipeline. The commencement of outfall operation was in 1984.

9. Is an Environmental Authorisation in progress? YES NO

This application for current existing effluent streams does not trigger a listed activity in terms of the National Environmental Management Act, 107 of 1994; therefore, an Environmental Authorisation process is not required. However, an EIA may be required for the CoCT proposed SWRO plant, yet to be confirmed.

SECTION F PUBLIC PARTICIPATION PROCESS

NOTE: *No Public Participation may commence without a CWDP reference number issued by the Department, where clarity will be given on the extent of the public participation required.*

NOTE: *The Applicant must take into account the Department's* ***"Guideline on public participation requirements for Coastal Waters Discharge Permit Application under section 69 of the National Environmental Management Act: Integrated Coastal Management Act 2008 (Act no.24 of 2008)"*** *when conducting public participation for a CWDP.*

CWDP reference number used during public participation process: 2012/011/WC/Koeberg Power Station.

The Public Participation Process was conducted in accordance with the Department's "Guideline on public participation requirements for Coastal Waters Discharge Permit Application under section 69 of the National Environmental Management Act: Integrated Coastal Management Act 2008 (Act no.24 of 2008)". All interested and affected parties (I&APs) were given the opportunity to comment on the CWDP during the 61-day comment period. All comments were incorporated into the final Coastal Water Discharge Permit Technical Report for submission to the Department of Environmental Affairs.

Following the initial public participation process, the CWDP application was amended in 2017. Given the amendment was not seen as significant, registered I&APs and commenting authorities were informed of the changes without an invitation to comment.

SECTION G SITE CHARACTERISATION

1. It is required by the applicant to attach to this application:

1.1. A detailed site map and aerial photograph indicating the following:

i. Point(s) of discharge - Refer to Figure 1 and Annexure B

ii. Location where effluent is generated on land - Refer to Figure 1 and Annexure B

iii. Effluent monitoring points – Refer to Figure 1 and Annexure B

iv. An indication of whether any diffusers have been connected to the pipeline. None

1.2. The total length of the pipeline (from the high water mark to the point of discharge): _0 m_____

1.3. The shortest straight line distance from the high water mark to the discharge point: ~135 m length of the KCWOB but high water mark is at the point of discharge (i.e. zero metres). _____

1.4. The depth of the discharge point (i.e. the depth at the end of the pipeline): Surf zone discharge._____

1.5. The Erf No: __ Farm Duynefontyn No 1552, situate in the City of Cape Town, Cape Division_____

(Attach relevant supporting documents to this application form)

2. Complete the following mandatory fields:

(Use either Decimal Degrees or Degrees Minutes and Seconds)

2.1. Co-ordinates for point/s of discharge (end of pipeline in coastal environment):

Point __A__	33°40'46.79"S 18°25'53.84"E (Top of discharge outlet basin)
Point _ B _	33°40'50.18"S 18°25'50.45"E (End of discharge outlet basin)

2.2. The GPS co-ordinates of the point where the coastal outfall pipeline crosses the high water mark:

Point_____	N/A

2.3. Co-ordinates for plant/generator of land derived effluent (terrestrial):

Point __ C__	33°40'36.64"S 18°25'53.32"E

SECTION H EFFLUENT CHARACTERISATION

1. Complete the following information (refer to the Annex for guidance on completing this section):

Quality Variable and unit of measurement	Average Discharge Concentration per month	Maximum Anticipated Discharge Concentration per month
Coliforms (Colony Forming Units/ml)	0	0.46
Enteric pathogens e.g. E.coli (Colony Forming Units/ml)	0	0.46
pH (pH units)	7.3 - 8.2*	7.3 - 8.2*
Temperature (°C)	24.7 (11.7 above inlet)	38.2 (21.2 above inlet)
Acidity (mg/l)		
Alkalinity (mg/l)		
Aluminium (mg/l)	0.00053*	0.0053*
Ammonia (mg/l)	0.023*	0.23*
Arsenic (mg/l)		
Barium (mg/l)		
Boron (mg/l)	0.06	5.02
Bromide (mg/l)		
Cadmium (mg/l)		
Calcium (mg/l)		
Chemical oxygen demand (mg/l)	0.362*	3.62*
Chloride (mg/l)	19489.12*	19489.12*
Chromium (mg/l)	0.00043*	0.0043*
Chromium(vi) (mg/l)		
Cobalt (mg/l)		
Copper (mg/l)	0.00009*	0.0009*
Cyanide (mg/l)		
Fluoride (mg/l)		
Iron (mg/l)	0.0004*	0.004*
Lead (mg/l)	0.00033*	0.0033*
Lithium (mg/l)	0.1714*	0.1714*
Manganese (mg/l)	0.00011*	0.0011*

Quality Variable and unit of measurement	Average Discharge Concentration per month	Maximum Anticipated Discharge Concentration per month
Mercury (mg/l)		
Molybdenum (mg/l)		
Nickel (mg/l)	0.00048*	0.0048*
Phenol (mg/l)		
Potassium (mg/l)		
Radionuclides (mg/l)	See note below	See note below
Salinity	35.2	35.2*
Soap, oil or grease (mg/l)	0.033*	0.33*
Sodium (mg/l)	10829*	10829*
Sulphate (mg/l)	2744*	2744*
Tin (mg/l)		
Total dissolved solids (mg/l)		
Total Suspended solids (mg/l)	4.704*	4.704*
Total nitrogen (mg/l) as nitrite and nitrate	0.73*	0.73*
Total phosphate as phosphorus (mg/l)	0.87*	0.87*
Uranium (mg/l)		
Vanadium (mg/l)		
Zinc (mg/l)	0.0003*	0.0033*

Note 1: Radioactive discharges are described in Chapter 4 of the Coastal Water Discharge Permit Technical Report (Annexure A).
Note 2: The table above is not exhaustive. Please refer to Table 4-6 in PRDW, 2017 report for a more comprehensive table of constituents.
* Estimated.

2. Complete the following Monthly discharge pattern (in Ml ~~volume~~) below and indicate the unit of measurement thereof:

Month	Average								Maximum							
January	0	2	4	3	3	3	3		0	2	4	3	3	3	3	
February	0	2	4	3	3	3	3		0	2	4	3	3	3	3	
March	0	2	4	3	3	3	3		0	2	4	3	3	3	3	
April	0	2	4	3	3	3	3		0	2	4	3	3	3	3	
May	0	2	4	3	3	3	3		0	2	4	3	3	3	3	
June	0	2	4	3	3	3	3		0	2	4	3	3	3	3	
July	0	2	4	3	3	3	3		0	2	4	3	3	3	3	
August	0	2	4	3	3	3	3		0	2	4	3	3	3	3	
September	0	2	4	3	3	3	3		0	2	4	3	3	3	3	
October	0	2	4	3	3	3	3		0	2	4	3	3	3	3	
November	0	2	4	3	3	3	3		0	2	4	3	3	3	3	
December	0	2	4	3	3	3	3		0	2	4	3	3	3	3	
Total/annum	2	9	2	0	0	0	0		2	9	2	0	0	0	0	

Max effluent discharge for cooling water is 2 920 000 Ml; and max purified domestic effluent discharge is 100 m^3.

In cubic meters x1000m^3 [ ] OR

% of total [ ] OR

Another unit of measurement (please specify) [x] ____Ml_____

3. Provide a description of any treatment processes applied to the effluent, where applicable.

Primary System

With the exception of steam generator blowdown (recirculated secondary water); Nuclear Island process effluent is the only waste stream which would require some form of radioactive treatment before discharge. The treatment systems for this waste stream are designed, depending on their specific function, to remove radioactive and non-radioactive contaminants from the primary circuit and effluents.

There are 3 main systems which remove contaminants from the water in the primary circuit and treat effluents prior to discharge:

- Chemical and Volume Control System;
- Coolant Storage and Treatment System; and
- Liquid Waste Processing System.

Chemical and Volume Control System: is used to maintain the chemistry of the primary coolant by taking some of the primary cooling water (referred to as let-down), cleaning it and returns the water back to the system (referred to as make-up). Treatment is by means of ion exchange resins and filters.

Coolant Storage and Treatment System: treats the liquid effluent from the primary circuit, by recycling some of the boron. Treatment entails demineralisation by ion exchange resins and filtration, evaporation and degassing. Non-recyclable liquid effluents are transferred to the Liquid Radwaste Monitoring and Discharge System.

Liquid Waste Processing System: is designed to safeguard against the discharge of contaminated effluent by enabling treatment through a variety of techniques, this allows effluents to be retreated and passed through different treatment techniques before being sampled and monitored and, if acceptable, discharged.

Secondary System

Steam Generator Blowdown System: includes a treatment system, with a primary purpose of removing non-radioactive corrosion products and dissolved salts before the water is recycled back into the secondary system. The treatment system essentially involves filtration and the use of ion exchange resins.

After purification, the water is sent to the main turbine condenser circuit where it is recycled. If analysis shows that the water remains unsuitable for re-use or the secondary system is not available, the treated effluent is sent to the SEK system after passing through a 5 µm filter, were it may be stored (depending on the chemical's half-life) for further monitoring and/or final discharge.

Conventional Island Liquid Waste Discharge System: the turbine system requires a range of oils, greases and lubricants to operate at maximum efficiency. Any water that comes into contact with such contaminants is treated by the oil-water separator system located within this system prior to being sent to the Liquid Waste Discharge System.

Production of Potable and Demineralised Water

The very low or very high pH effluent generated by the Demineralised Water Production Plant and Reverse Osmosis Plant is batch treated using acids and alkalis which results in a neutral pH. No further treatment of effluent is required.

Domestic Effluent Treatment

The plant generates domestic effluent from the on-site workforce within the offices, canteen, laundry services, etc. Most (~80%) of this effluent is discharged to the local municipal Melkbosstrand WWTW while some is treated at the on-site WWTW (with a hydraulic peak of 28 m^3/hour) which utilises activated sludge technology for treatment. Currently, the treated effluent, once mixed with cooling water (CRF), must comply with the quality requirements of the General Standard prescribed in GN 991 of 18 May 1984, with the exception of faecal coli. Final treated effluent is then discharged to the outfall basin.

Refer to chapter 5 of the Coastal Water Discharge Permit Technical Report (Annexure A) for further detail.

SECTION I COMPLIANCE MONITORING AND REPORTING

1. Provide a description of all monitoring points along the effluent stream.

As referred above, KNPS is a complex plant made up of various liquid processing systems each of which has its own monitoring systems and monitoring programmes. All waste effluent is under permanent monitoring and surveillance, before being discharged from the site. System instrumentation continuously logs data on digital or paper chart recorders and sends electronic notifications to the operators located within the control room. Over and above this, manual monitoring is undertaken according to a specific regimen to ensure the quality of the individual systems (and waste streams in this case); this is undertaken at the various individual outlets throughout the plant, rather than at the final discharge point. For the purposes of this application, only the following monitoring outlets will be discussed (refer to Figure 1) as these discharges to the KCWOB:

- CRF;
- SEC;
- KER;
- DEL;
- SRO and SWRO;
- SEK; and
- SEU, prior to discharge from the WWTW.

The following outlets discharging into the KCWIB are monitored:

- XCA;
- SDA;
- SDX;
- DEL; and
- CTE

The Main Circulating Water Circuit (CRF)

The main circulating water is monitored post discharge from the turbine condenser.

Essential Service Water System (SEC)

The cooling water is monitored post discharge from the SEC heat exchangers.

Radiological Effluent Discharge System (KER)

The release of radioactive effluents is regulated by the National Nuclear Regulatory Act, 47 of 1999. Nuclear Regulations (GNR 388) sets criteria for the discharge of radioactive liquid releases to the environment. This regulation specifies the monitoring and measurement of released activity. The Annual Authorised Discharge Quantity (AADQ) (of radioactive effluent) is determined in agreement with the NNR and in accordance with the conditions of the nuclear installation license and the regulations on Safety Standards and Regulatory Practices (SSRP).

The scope of this application is limited to the water discharge activity for non-radioactive substances and as such only the discharge of non-radioactive substances from the KER system forms part of this application.

However for information purposes, before a radiological release is approved from the KER tanks, each tank is recirculated to ensure the contents have homogenised, a manual sample is taken and analysed by gamma spectrometry. Releases are controlled by ensuring that the gamma activities comply with the AADQ. In addition, gross alpha and tritium analyses are periodically performed on composite samples.

Furthermore, the outlets of the KER tanks (all three of them) are equipped with instrumentation for activity monitoring during batch releases, with an alarm in the control room and automatic termination of the release should the pre-set threshold be exceeded. When discharge is terminated, additional manual monitoring is conducted on each tank during recirculation. Provision exists to divert KER to SEK for further monitoring and treatment.

Secondary Releases System (SEK)

Some systems that discharge to the SEK system are not monitored in the SEK system but rather in the system prior to it being discharged to SEK. In some other cases, effluent is also sampled in the SEK system. And in some cases, monitoring is only performed in the SEK system.

Within the SEK system, Radiation and Chemistry monitoring is continuously applied, which must also comply with NNR radiological established limits. A system for continuous measurement of gross gamma activity is installed on the sampling lines of the steam generator blow-down for each unit and the SEK tank bypass, with alarming and recording in the control room. If radioactive contamination is detected, the effluent discharge is diverted to storage within the one of the two storage tanks. Similar to the KER system, manual monitoring is conducted on the tanks prior to release.

Domestic Waste Water Treatment Works (SEU)

Final treated effluent is monitored post discharge from the WWTW.

Ground Water and Sea Water Reverse Osmosis Plants (SRO and SWRO)

These plants are not yet in operation.

Discharges into KCWIB

The systems that discharge into the intake basin include DEL, SDA, SDX, CTE and XCA. Although the XCA and DEL systems are not sampled prior to release, they systems are routinely sampled to ensure that the chemical dosing is in

specification. This provides confidence that any discharges are within specification. Final effluent from the SDX and the acid tank in the CTE system are sampled before release. The SDX effluent is not sampled before release.

---

2. Provide the frequency of monitoring of the above mentioned monitoring point(s).

- CRF – Continuous monitoring by instrumentation for temperature, and manual chemistry monitoring once every shift (i.e. 8 hours) -
  - Free Chlorine – once every 8 hours;
- SEC - Continuous monitoring by instrumentation for flow, and the following manual chemistry monitoring -
  - Free Chlorine – once every 8 hours / as when required;
  - Radioactive Iodine-131 - once every 7 days;
  - Radioactive Tritium – once every 31 days;
  - Radioactive Gross Alpha - once every 31 days;
  - Radioactive Total Strontium – once every 92 days;
- KER - Continuous radiological monitoring by instrumentation, and the following manual chemistry monitoring -
  - Boron - prior to any action (release, transfer, etc.);
  - Radioactive Gamma Spectrum - prior to any action (release, transfer, etc.);
  - Radioactive Iodine-131 - prior to any action (release, transfer, etc.);
  - Radioactive Tritium – once every 31 days;
  - Radioactive Gross Alpha OTS - once every 31 days;
  - Radioactive Total Strontium OTS – once every 92 days;
  - Phosphate – at least once every 31 days in systems that discharge to KER; and
  - pH – prior to any release;
- SEK system - Continuous radioactive monitoring by instrumentation, and the following manual chemistry monitoring –
  - Ethanolamine – once every 7 days in SEK;
  - Ammonia – once every 7 days in SEK;
  - Radioactive Gamma Spectrum - prior to any batch action (release, transfer, etc.) and weekly for SEK tank bypass in SEK;
  - Radioactive Iodine-131 - prior to any action (release, transfer, etc.) and weekly for SEK tank bypass;
  - Radioactive Tritium – once every 31 days in SEK;
  - Radioactive Gross Alpha OTS - once every 31 days in SEK;
  - Radioactive Total Strontium OTS – once every 92 days in SEK
  - Hydrazine – periodic sampling varies in relevant systems that discharge to SEK;
  - pH – at least once every 7 days in SEK; and
  - Phosphate – at least every 31 days in systems that discharge to SEK.
- WWTW (SEU) – manual chemistry sampling:
  - Free Chlorine – at least once every 7 days;
  - Suspended solids - once every 14 days;
  - Faecal Coliforms - once every 31 days; and
  - Flow rate – once every 24 hours;
- SRO and SWRO
  - Plants currently not in operation. The monitoring programme is still to be developed.
- XCA – manual chemistry sampling
  - Hydrazine – at least once every 14 days in XCA;
  - pH – at least once every 7 days in XCA;
- CTE – manual chemistry sampling
  - pH – prior to release of acid tank from CTE;

- SDX – manual chemistry sampling
    - pH – prior to release of SDX sump;
- DEL – Manual chemistry sampling
    - Phosphate – at least once every 31 days for DEL;

---

3. Provide a detailed description of the type of monitoring, management strategies and maintenance plans implemented for effluent quantity and quality, the receiving environment as well as structural integrity of the pipeline.

Sampling and Monitoring Equipment

All discharges of liquid effluents are monitored for flow and concentration of the chemical parameters expected to be present in the effluent tanks for the various systems mentioned above. All of the samples taken from the various storage tanks of the systems are analysed at the on-site laboratory. The sampling system allows for samples to be taken that are representative of the contents of the tanks once their contents have mixed.

All sampling and monitoring equipment is subject to a programme of preventative maintenance, involving a periodic check of their operation and a periodic calibration. Records of all maintenance and calibration is kept secure and made available to the NNR or any other state department when required. Reports are also submitted to the NNR on a quarterly basis, as per the licence requirements.

Monitoring Procedures

Analysis prior to discharge: involves the analysis of the physico-chemical parameters of the effluent from the tanks prior to discharge. A representative once-off sample is carried out in each tank with laboratory analysis undertaken prior to the effluent being discharged from the tank. The type of analyses performed is dependent on the system being monitored.

Analysis post discharge: involves the analysis of the other physico-chemical parameters of liquid effluent within the discharge pipeline at continuous discharge. In addition, a sample from each tank is retained for a composite sample which is analysed periodically, for certain constituents, to complete the account of releases.

Compliance Monitoring

A programme of monitoring effluents against discharge limits is enforced by the relevant permits and implemented on site. The programme involves a range of compliance tests including flow rate, concentrations, and volumes.

Management Strategies

The regulatory control of KNPS is exercised by means of a nuclear licence that is issued by the NNR and which incorporates the necessary authorisation conditions to ensure that the safety related aspects of the plant design and general operating rules are complied with. The NNR is also responsible for issuing a nuclear licence which controls the operation, decommissioning and closure of KNPS. In April 2006 the safety regulation was published as Safety Standards and Regulatory Practices. The safety regulations require, amongst others, that the plant be maintained and inspected to ensure the reliability and integrity of the installation, equipment and plant important to nuclear and radiation safety, and that operational safety assessments be performed and submitted to the NNR at specified intervals.

In terms of the NNR Act, the licensee is required to establish and implement an inspection programme to ensure compliance with the requirements of the nuclear authorisation and provide any information at a frequency determined and required by the NNR including:

- Reports on problem, incident and accident notification, investigation and closeout;
- Quality assurance and audit reports including closeout reports;
- Environmental monitoring reports; and

- Reports on liquid and gaseous effluent discharges.

In addition, the NNR requires the licensee to develop and maintain a documented safety case which demonstrates compliance with the requirements of the NNR regulations and international standards.

Typical licence conditions included in the nuclear authorisation are:

- The description and configuration of the authorised facility or action;
- Safety Assessment;
- Scope of activities that might be undertaken;
- Controls and limitations on operation;
- Maintenance, testing and inspection requirements;
- Operation radiation protection programmes;
- Effluent management programmes;
- Radioactive waste management programmes;
- Environmental monitoring;
- Emergency planning and preparedness requirements;
- Physical security;
- Transport of radioactive material,
- Decommissioning;
- Financial security;
- Quality management ;
- Acceptance and approval; and
- Reporting.

A compliance assurance programme is implemented on site, which comprises of inspections, surveillances and audits as well as various forums for interaction with the nuclear authorisation holder. The NNR compliance assurance programme is based on safety goals that were developed from the principal radiation protection and nuclear safety requirements of the Safety Standards and Regulatory Practices (SSRP). The NNR compliance assurance programme was established to provide assurance of the state of health of plant, processes, organisation and environment in terms of identified safety goals. Safety practices are achieved by ensuring that the nuclear authorisation holder complies with the conditions of the nuclear installation licence. The NNR conducts independent compliance assurance activities to determine the extent to which holders of nuclear authorisations comply with the conditions of authorisation. An ongoing monitoring and inspection programme is implemented by the licensee, and is regularly assessed by the NNR to ensure compliance with the nuclear authorisation.

---

4. Provide the historic data on monitoring and compliance for the coastal outfall pipeline. Attach your information to this application form.

Please note the discharge is not via an outfall pipeline but rather an outfall basin. Furthermore, monitoring of the effluent discharge takes place upstream of the basin and not at this discharge point. Refer to Appendix F of the Coastal Water Discharge Permit Technical Report (Annexure A) for a copy of the last 5 years compliance monitoring data, which proves KNPS's compliance to the above mentioned permit.

---

5. Provide a detailed description of maintenance plans in place for recording/monitoring devices, if any.

All sampling and monitoring equipment is subject to a programme of preventative maintenance, involving a periodic check of their operation and a periodic calibration. Checks are dependent on the operational, manufacturer and licence requirements. In addition, KNPS has an annual or bi-annual maintenance shutdown. Records of all maintenance and

calibration are kept secure and made available to the NNR or any other state department when required. Reports are also submitted to the NNR on a quarterly basis, as per the licence requirements.

---

6. Provide a detailed description of maintenance plans in place for treatment facilities, if any.

All systems and associated infrastructure is subject to a programme of preventative and corrective maintenance.

The Reliability Engineering group is the custodian of the Integrated Equipment Reliability process which is based on the INPO (Institute of Nuclear Plant Operators) AP-913 guidance. The preventative maintenance (PM) programme is developed and monitored by the Reliability Engineering group. The Equipment Reliability (ER) classification provides the functional importance of components in four tiers: critical, significant, economic and run-to-maintenance. This ER classification together with the preventive maintenance templates forms the preventive maintenance strategy. This in entirety is referred to as the Preventive Maintenance Basis.

Component failures are investigated by the Component Engineering Group. These failure investigations sometimes result in changes to the preventive maintenance programme, which is part of the living PM programme of continuous improvement.

Emerging maintenance issues are driven in the Plan of the Day (POD) meeting and if deemed to be of medium to long term in nature, it is managed by the Plant Health Committee to ensure the timely resolution of any issues.

The longer term system health management of the various plant systems is controlled by the development of Life of Plant Plans (LOPPs). The LOPPs summarise the maintenance and testing regimes and develops a life plan for the system. The LOPP highlights the threats posed to the system, impact that the threats have on continued system reliability and presents measures that have been put into place to mitigate the risks posed by the identified threats.

In addition to the maintenance programmes, periodic testing is important for the assurance of operational safety. A periodic test programme has been designed and implemented at the KNPS, it comprises of functional tests, verifications, visual inspections, observations and/or measurements carried out periodically on equipment. Systems, structures, and components that perform safety functions are subject to the periodic test programme. The periodic test programme is a regulatory requirement, and periodic testing schedules require formal approval by the NNR.

---

7. Provide a copy of any prior authorisation issued for the coastal discharge by the Department of Water Affairs, including a record of compliance for the last 12 (twelve) months to such an authorisation. Attach your information.

Please refer to Appendix A of the Coastal Water Discharge Permit Technical Report (Annexure A) for a copy of the 853N permit and 1133B exemption in terms of the Water Act (WA), Act 54 of 1956.

Please refer to Appendix F of the Coastal Water Discharge Permit Technical Report (Annexure A) for a copy of the last 5 years monitoring results, which proves KNPS's compliance to the above mentioned permit.

---

8. For **existing outfalls**, do you have a lease agreement issued in terms of the Sea Shore Act, 1935 (Act No. 21 of 1935) for the pipeline below the high water mark or proof of submission of an application for such a lease agreement to the relevant authority? YES NO

9. If YES, attach the proof thereof.

Refer to Appendix C of the Coastal Water Discharge Permit Technical Report (Annexure A)

---

10. Provide details of the mandatory reporting regime as contained in Annexure 1 (Reporting).

The following requirements are noted in Annexure 1: Generic Assessment Criteria for Coastal Waters Discharge Permits document.

10.1. Permit Advisory Forum (or equivalent body) comprising relevant stakeholders, with independent facilitation, at the cost of the permit holder.

At present there is no formal CWDP forum, however the Public Safety Information Forum (which comprises of relevant Eskom staff; various officials from the Provincial and Municipal Environmental Departments, and other relevant state organisations, including members of public) have been used to disseminate information. In addition, all monitoring and compliance reporting is done to the NNR as the statutory authority on the compliance assurance programme.

10.2. The results/findings of the monitoring programme above and the frequency, preparation and dissemination of the reports on compliance, trends and incidents as well as the annual marine impact assessments as required by the Department.

In terms of the NNR Act, KNPS is required to establish and implement an inspection programme to ensure compliance with the requirements of the nuclear authorisation and provide any information at a frequency determined and required by the NNR. In addition, the NNR requires the licensee to develop and maintain a documented safety case which demonstrates compliance with the requirements of the NNR regulations and any other relevant licence standards or conditions.

The NNR conducts independent compliance assurance activities to determine the extent to KNPS complies with the conditions of authorisation. An ongoing monitoring and inspection programme is implemented by KNPS, and is regularly assessed by the NNR to ensure compliance with the nuclear authorisation. Records are kept secure and made available to the NNR or any other state department when required.

10.3. The review process in terms of the Waste/Water/Energy Hierarchy to ensure that best practice is considered to continuously improve the quality of the wastewater discharged to the marine environment.

The NNR conducts independent compliance assurance activities to determine the extent to KNPS complies with the conditions of authorisation. Its role is also to ensure that the licensee applies the best practice in terms of the nuclear industry to continuously improve of processes conducted at the plant. It should also be noted that KNPS is a signatory of the World Association of Nuclear Operators (WANO), which exists purely to help members accomplish the highest levels of operational safety and reliability. This is achieved through a series of highly-regarded programmes, such as peer reviews, and access to technical support and a global library of operating experience.

SECTION J CONTINGENCY AND DECOMMISSIONING PLANNING

1. Provide information on pipeline incidences, continuous improvement plans, contingency plans for effluent discharge and decommissioning plans implemented at or adopted by the facility for the past 12 (twelve) months, if available.

Contingency plans include the option of re-routing discharges from both the Nuclear Island and Conventional Island to the SEK holding tanks; this is only done during abnormal conditions which include:

- The radiological waste activity is too high for dilution to the receiving environment. In such circumstances the radiological liquid waste is reprocessed or delayed release depending on the half-life of the contaminant;
- The Radiological Effluent Monitoring and Discharge System (KER) tanks are filled to capacity because of an abnormal condition.

KNPS units were commissioned in 1983 and 1984 respectively, with an expected operational life of 40 to 60 years. Decommissioning plans are expected to commence any time between 2025 and 2045. Decommissioning shall be conducted in a phased approach, which includes:

- Phase 1 – Preparation;
- Phase 2 – Plant shutdown and defueling;
- Phase 3 – Implementation of the spent fuel pool cooling separation plan;
- Phase 4 – Decommissioning operations (i.e. demolition of Conventional Island and auxiliaries; safe enclosure preparation; and electromechanical dismantling);
- Phase 5 – Spent fuel removal and electromechanical dismantling of the fuel building and auxiliaries; and
- Phase 6 – Demolition of remaining structures and site rehabilitation.

The decommissioning of marine structures will be part of the decommissioning of the power station after performing an Environmental Impact Assessment for that activity.

SECTION K SPECIALIST TECHNICAL AND ENGINEERING REQUIREMENTS

1. Provide a detailed report on the following specialist technical and engineering requirements (refer to Annex for more on the generic requirements) if applicable:

1.1 Scope of study area and features

Please refer to:

- Chapter 3 of the Coastal Water Discharge Permit Technical Report (Annexure A);
- Marine Ecology Specialist Report, section 2, Appendix B1 of the Coastal Water Discharge Permit Technical Report (Annexure A); and
- Modelling Specialist Report, section 2, Appendix B2 of the Coastal Water Discharge Permit Technical Report (Annexure A).

1.2 Biogeochemical processes (water column and sediment)

Please refer to Marine Ecology Specialist Report, Appendix B1 of the Coastal Water Discharge Permit Technical Report (Annexure A).

1.3 Marine ecology

Please refer to Marine Ecology Specialist Report, Appendix B1 of the Coastal Water Discharge Permit Technical Report (Annexure A).

1.4 Microbiological Factors

Please refer to Marine Ecology Specialist Report, Appendix B1 of the Coastal Water Discharge Permit Technical Report (Annexure A).

1.5 Hydraulic design

Please refer to Modelling Specialist Report, Appendix B2 of the Coastal Water Discharge Permit Technical Report (Annexure A).

1.6 Achievable dilution

Please refer to Modelling Specialist Report, Appendix B2 of the Coastal Water Discharge Permit Technical Report (Annexure A).

1.7 Sedimentation/re-suspension of solid phase particles

Please refer to Modelling Specialist Report, Appendix B2 of the Coastal Water Discharge Permit Technical Report (Annexure A).

1.8 Pipeline construction considerations and structural design (including decommissioning)

Discharge is via an outfall basin and not a pipeline. Nevertheless, the outfall and intake basin design needed to prevent recirculation of effluent back into the intake of the power station.

Please refer to Modelling Specialist Report, Appendix B2 of the Coastal Water Discharge Permit Technical Report (Annexure A).

2. Describe any gaps in the above knowledge, any underlying assumptions made and any uncertainties when conducting the above specialist study (ies) in the above mentioned detailed report.

Refer to the specialist studies, Appendix B of the Coastal Water Discharge Permit Technical Report (Annexure A), for any underlying assumptions or gaps made in terms of the respective studies.

DECLARATION

I VELAPHI NTULI, in my personal capacity or duly authorised as POWER STATION MANAGER (state your capacity) by ..... thereto hereby declare that I:

- regard the information contained in this application form and associated documentation submitted to be true and correct, and
- am fully aware of my responsibilities in terms of **Section 69 of the Integrated Coastal Management Act, 2008 (Act No. 24 of 2008);**
- have provided access to all information at my disposal that is relevant to the application;
- will be responsible for the costs incurred in complying with the environmental legislation including but not limited to –
  - costs incurred in connection with the appointment of a specialist/ consultant ;
  - costs incurred in respect of the undertaking of any process required in terms of this application;
  - costs in respect of any fee prescribed by the Minister in respect of this application and the discharge; and
  - the provision of security to ensure compliance with the applicable management and mitigation measures;
- am responsible for complying with the conditions that might be attached to any decision(s) issued by the Department;
- have the ability to implement the applicable management, mitigation and monitoring measures; and
- hereby indemnify, the government of the Republic, the Department of Environmental Affairs and all its officers, agents and employees, from any liability arising out of, inter alia, the content of any report, any procedure or any action for which the applicant or environmental assessment practitioner is responsible.

Please Note: If acting in a representative capacity, a certified copy of the resolution or power of attorney must be attached.

.....*(Signature)* KOEBERG POWER STATION *(Place)*

(yyyy/mm/dd) 2017-09-22 *:(Date)* STATION MANAGER *(Designation/capacity)*

ESKOM (KOEBERG NUCLEAR POWER STATION) *(Name of company/municipality/organisation)*

	Name and Surname	Address	Signature
Witness 1	DEON JEANNES	KOEBERG POWER STATION	
Witness 2	I. BOWERS	KNP	

FINAL Check list (tick the box were applicable)

1.	Paid prescribed application fee	N/A
2.	Motivation for the discharge as a BPEO	√
3.	Specialist technical and engineering requirements for assessment (Annexure 1)	√
4.	Environmental Authorisation and details, if applicable	N/A
5.	Lease agreement issued in terms of the Sea Shore Act, 1935 (Act No. 21 of 1935) for the pipeline below the high water mark or proof of submission of such an application, if applicable	√
6.	A copy of the baseline marine impact assessment for the receiving environment surrounding the coastal outfall pipeline	√
7.	A report outlining the impact of the effluent on the coastal receiving environment	√
8.	Information on any public forum established for the coastal outfall pipeline, including minutes of such meetings if applicable	√
9.	A copy of all comments and responses received and made during the public participation period	√
10	A copy of any prior authorisation issued for the coastal discharge by the Department of Water Affairs	√
11.	Record of compliance for the last 12 (twelve) to the authorisation mentioned above	√

ANNEXURE A - COASTAL WATER DISCHARGE PERMIT TECHNICAL REPORT