ESKOM PROPOSED NUCLEAR-1 POWER STATION AND ASSOCIATED INFRASTRUCTURE

FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT

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LIST OF ABBREVIATIONS / ACRONYMS

%	Percentage
℃	Degrees Celsius
µSv	Micro Sieverts
AADQ	Annual Authorized Discharged Quantities
ABI	Agulhas Biodiversity Initiative
ACER	ACER (Arica) Environmental Consultants (Pty) Ltd
AIDS	Acquired Immuno Deficiency Syndrome
AP1000	Advanced Passive, form of an advanced pressurised water reactor
APPA	Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965)
ARC	Agricultural Resource Centre
Arcus GIBB	Arcus GIBB (Pty) Ltd
AsgiSA	Accelerated and shared Growth Initiative for South Africa
ALARA	As Low As Reasonably Achievable
B&B	Bed and Breakfast
BID	Background Information Document
BMP	Best Management Practise
BWR	Boiling Water Reactor
CAPE	Cape Action Plan for People and the Environment
CCGT	Combined Cycle Gas Turbine
CDC	Coega Development Corporation
CDM	Clean Development Mechanism
ECO	Environmental Control Officer
CFR	Cape Floristic Region
CGS	Council for Geoscience
CIGS	Copper-Indium-Gallium-diSelenide
CO_2	Carbon dioxide
CSIR	Council for Science and Industrial Research
CSP	Concentrating Solar Power
CV	Coefficient of variation / *Curriculum vitae*
dB(A)	decibel
DBA	Design Basis Accidents
De Beers	De Beers Consolidated Mines
DEA&DP	Department of Environmental Affairs and Development Planning (Provincial Government Western Cape)
DEA	Department of Environmental Affairs (National Government)
DEAT	Department of Environmental Affairs and Tourism (Now DEA)
DEDEA	Department of Economic Development and Environmental Affairs (Provincial Government Eastern Cape)
DMA	Disaster Management Act
DME	Department of Minerals and Energy (National Government)
DOE	Department of Energy (National Government)
DOL	Department of Labour (National Government)
DPW	Department of Public Works (National Government)
DSR	Draft Scoping Report

DTEC	Department of Tourism, Environment and Conservation (Provincial Government Northern Cape)
DWA	Department of Water Affairs (National Government)
DWAF	Department of Water Affairs and Forestry (Now DWA)
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
ECT B	Eastern Cape Tourism Board
EDG	Emergency Diesel Generator
EEU	Environmental Evaluation Unit
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
ELA	Earthlife Africa
ELC	Environmental Liaison Committee
EMF	Electromagnetic Frequencies
EMP	Environmental Management Plan
EN	Endangered
EPR	European Pressurised Reactor also known as Evolutionary Power Reactor
EPSOC	Emergency Planning Steering and Oversight Committees
EPZ	Emergency Planning Zone
Eskom	Eskom Holdings Limited
EUR	European Utility Requirements
FBC	Fluidised Bed Combustion
FGM	Focus Group Meeting
FOB	Fish on Board
FSR	Final Scoping Report
GCR	Gas Cooled Reactor
GDP	Gross Domestic Product
GHG	Green House Gas
GW	Gigawatt
GWh	Gigawatt hours
H_2O	Dihydrogen oxide (water)
Ha	Hectare
HBD	Headland Bypass Dune
HEU	High-Enriched Uranium
HIV	Human Immuno-deficiency Virus
HLW	High Level Waste
HPa	Hectopascal
HRSG	Heat Recovery Steam Generator
HSE	Health, Safety and Environment
HV	High Voltage
I&APs	Interested and affected parties
IAEA	International Atomic Energy Agency
ICM	Integrated Coastal Management
IDP	Integrated Development Plan
IDZ	Industrial Development Zone
IEP	Integrated Energy Plan
IGCC	Integrated Gasification Combined Cycle
IIS	Integrated Investment Strategy
ILW	Intermediate Level Waste

IPP	Independent Power Producer
IRP	Integrated Resource Planning
IRR	Issues and Response Report
IRWST	In-containment Refueling Water Storage Tank
ISEP	Integrated Strategic Electricity Planning
ISO	International Standards Organisation
ITP	Integrated Transport Plan
IUCN	International Union for the Conservation of Nature
IUCN SSC	International Union for the Conservation of Nature Species Survival Commission
kg	kilogram
Kℓ	Kilolitre
KLM	Kouga Local Municipality
km	Kilometre
KNPR	Koeberg Nuclear Power Station Reserve
KSW	Key Stakeholder Workshop
kW	Kilowatt
L/s	Litres per second
LEU	Low-Enriched Uranium
LILW	Low and Intermediate Level Waste
LL	Long Lived
LLW	Low Level Waste
LOS	Level of Service
LSA	Late Stone Age
LUPO	Land Use Planning Ordinance
LWCGMR	Light Water Cooled Graphite Moderated Reactor
m	Metre
M	Magnitude
m^3	Cubic Metre
m^3/day	Cubic Metres per day
Ma	Million years before present
MAE	Mean Annual Evaporation
mamsl	metres above mean sea level
MAP	Mean Annual Precipitation
MAR	Mean Annual Runoff
mbgl	metres below ground level
mg	milligram
mS	Millisiemen
MSL	Mean Sea Level
mSv	Millisievert
MTPPP	Medium Term Power Purchase Agreement
MW	Megawatt
MWe	Megawatt electrical
MWh	Megawatt hour
MWt	Megawatt thermal
MYPD	Multi-Year Price Determination
N2	National Road 2
NAMA	Nationally Appropriate Mitigation Actions
NBSAP	National Biodiversity Strategy Action Plan
NDM	Namakwa District Municipality

NEA	Nuclear Energy Agency
NECSA	National Energy Council of South Africa
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEM:AQA	National Environmental Management: Air Quality Act 2004 (Act No. 39 of 2004)
NEM:PAA	National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)
NEPAD	New Partnership for African Development
NERSA	National Energy Regulator of South Africa
NGO	Non-governmental Organisation
NIA	National Intelligence Agency
NIERP	National Integrated Energy Resources Plan
NIRP	National Integrated Resources Plan
NMBM	Nelson Mandela Bay Municipality
NNR	National Nuclear Regulator
NORM	Naturally Occurring Radioactive Material
NOx	Nitrogen oxides
NPS	Nuclear Power Station
NSBA	National Spatial Biodiversity Assessment
NSIP	Nuclear Site Investigation Programme
nSv/h	nano Sievert per hour
NT	Near Threatened
O_2	Oxygen
OCB	Owner Controlled Boundary
OCGT	Open Cycle Gas Turbine
OECD	Organisation for Economic Co-operation and Development
OHS	Occupational Health and Safety
PAZ	Protective Action Zone
PBMR	Pebble Bed Modular Reactor
PCS	Passive Containment Cooling System
PGA	Peak Ground Acceleration
PGDS	Provincial Growth and Development Strategy
PHWMR	Pressurised Heavy Water Moderated Reactor
PM	Public Meeting
ppm	parts per million
PPP	Public Participation Process
ppt	parts per thousand
PRA	Probabilistic Risk Assessment
PSHA	Probabilistic Seismic Hazard Analysis
PSM	Project Site Manager
PV	Photovoltaic
PWR	Pressurised Water Reactor
PXS	Passive Core Cooling System
RED	Regional Electricity Distributors
REFIT	Renewable Energy Feed in Tariff
RPV	Reactor Pressure Vessel
RTS	Return to Service
SA	South Africa
SADC	South African Democratic Countries
SAHRA	South African Heritage Resource Agency

SANParks	South African National Parks
SANS	South African National Standards
SAR	Safety Analysis Report
SBO	Station Blackout
SDF	Spatial Development Framework
SDP	Strategic Development Plan
SKEP	Succulent Karoo Ecosystem Programme
SL	Short Lived
SM	Site Manager
SMME	Small Medium and Micro Enterprise
SO_2	Sulphur dioxide
SOx	Sulphur oxides
SSE	Safe Shutdown Earthquake
SSEGM	Safe Shutdown Earthquake Ground Motion
SSHAC	Senior Seismic Hazard Analysis Committee
SSI	Stewart Scott International
SST	Sea Surface Temperature
STD	Sexually Transmitted Disease
STEP	Subtropical Thicket Environmental Programme
t	tonnes (metric)
t/h	tonnes per hour
TAC	Total Allowable Catch
TMG	Table Mountain Group
TMI	Three Mile Island
TWy	Terra Watt year
U_3O_8	Uranium oxide
UCG	Underground Coal Gasification
UCT	University of Cape Town
UF_6	Uranium hexaflouride
UNFCCC	United Nations Framework Convention on Climate Change
UPZ	Urgent Protective Action Zone
US NRC	United States Nuclear Regulatory Commission
USA	United States of America
VES	Control Room Emergency Habitability Systems
VOCs	Volatile Organic Compounds
VU	Vulnerable
WBFC	Walker Bay Fynbos Conservancy
WCSDF	Western Cape Spatial Development Framework
WMA	Water Management Area
WSDPs	Water Services Development Plans
WWII	World War Two

GLOSSARY OF TERMS

Term	Definition
Advection	The horizontal transport of air or atmospheric properties. Commonly used with temperatures, i.e., "warm air advection".
Advection fog	A type of fog caused by the horizontal movement of moist air over a cold surface and the consequent cooling of that air to below its dew point.
Aeolian	Transported and deposited by wind. A rock formed by the solidification of Aeolian sediment is known as an aeolianite.
Alternatives	Different means of meeting the general purpose and requirements of the activity, which may include alternatives to – location, type, design, technology of operational aspects of the activity.
Annulus	The distance between two objects.
Anomaly	Any departure from the norm, which may indicate the presence of mineralization in the underlying bedrock in geological terms.
Aquifer	A geological formation capable of yielding economic quantities of water.
Barchanoid	As of dunes. Immature mobile transverse dunes, unvegetated.
Bioregion	An area constituting a natural ecological community with characteristic flora, fauna, and environmental conditions and bounded by natural rather than artificial borders.
Borehole	A borehole is a deep and narrow shaft in the ground used for extraction of fluid or gas reserves below the earth's surface.
Brittle-ductile	Transitional conditions between brittle and ductile or plastic flow.
Cenozoic	Last 65 million years; an era of geologic time from the beginning of the Tertiary period (65 million years ago) to the present. Its name is from Greek and means "new life."
Chlorophyll a	The pigment that makes plants and algae green. Measurement of chlorophyll a is used to determine the quantity of algae in the water.
Coastal current	Any more or less permanent or continuous directed movement of ocean water that flows in one of the Earth's oceans.
Cretaceous	The final period of the Mesozoic era, spanning the time between 145 and 65 million years ago.
Critically Endangered	The status of a species that has satisfied the International Union for the Conservation of Nature and Natural Resources (IUCN), also known as the World Conservation Union, criteria that indicate that it faces as an extremely high risk of extinction in the wild.
Crustaceans	A class of articulated animals, having the skin of the body generally more or less hardened by the deposition of calcareous matter, breathing by means of gills. (Examples, Crab, Lobster, Shrimp, etc.).
Cultivated (of land or fields)	No longer in the natural state; developed by human care and for human use.
dBA	Environmental noise measurements are measured in terms of dBA. The A weighting aims to correspond to the frequency sensitivity of the human ear
Desalination	A process that converts seawater or brackish water to fresh

	water or an otherwise more usable condition through removal of salts and other dissolved solids.
Diffuse attenuation co-efficient	Measure of how far the sun's radiance penetrates the ocean at a wavelength of 490 nano metres (nm).
Dispatchable Resource	A resource whose electrical output is available at short notice and can be controlled or regulated to match the electrical energy requirements of the electric system, and is not affected by phenomena such as the time of day or weather conditions. Nuclear power and coal power are both dispatchable.
Dorbank	A hard subsurface soil horizon forms in arid/semi-arid climates, through cementation by silica, often in association with calcium carbonate or iron oxides. It is often reddish-brown in colour, as has been found at Brazil and Schulpfontein.
Dune field	Descriptive of an area with numerous low hills or banks of drifted (wind-borne) sand.
Dyke	A discordant intrusive body that is substantially longer than it is wide. Dikes are often steeply inclined or nearly vertical. A dyke is a tabular (sheet-like) igneous intrusion that cuts the surrounding strata at an angle.
Ecotone	A geographic boundary or transition zone between two different groups of plant or animal distributions containing characteristic species of each.
Embayment	An indentation of a shoreline, larger than a cove (small inlet) but smaller than a gulf (arm of a sea or ocean partly enclosed by land).
Endangered	The status of a species that has satisfied the IUCN criteria that indicate that it faces as a very high risk of extinction in the wild.
Endemic	In biology and ecology, endemic means exclusively native to the biota of a specific place.
Environment	The surroundings within which humans exist and include biophysical, social and economic aspects.
Environmental Impact Assessment	An Environmental Assessment is required when an activity(ies) triggers a regulation(s) listed in Government Notices R 386 and R 387 in Government Gazette 28753 dated 21 April 2006. Depending on the activity(ies) either a Basic Assessment (for activities listed in R 386) or a Scoping and Environment Impact Assessment (for activities listed in R 387) is undertaken. The construction of the proposed nuclear power station triggers regulations requiring a Scoping and Environmental Impact Assessment.
Environmental Impact	A positive or negative change to the environment that results from the effect of a construction activity. The impact may be a direct or indirect consequence of a construction activity.
Ephemeral	Short lived. Living or lasting only for a day, as certain plants or insects do.
Fault	A fault is a fracture or fracture zone, along which movement has taken place. Sudden movement along a fault produces earthquakes. Slow movement produces a seismic creep. A fault is a tectonic structure along which differential slippage of the adjacent earth materials has occurred parallel to the fracture plane. It is distinct from other types of ground disruptions such as landslides, fissures and craters. A fault may have gouge or breccia between its two walls and includes any associated monoclinal flexure or other similar geologic structural

	feature.
Fission	The splitting of an atom into at least two other atoms and the release of a relatively large amount of energy.
Geomorphology	Geomorphology is the study of landforms, including their origin and evolution, and the processes that shape them.
Gneiss	Rock formed by regional metamorphism in which bands or lenticles of granular minerals alternate with bands or lenticles characterised by minerals having flaky or elongate prismatic shapes.
Grabens	A depressed block of land bordered by parallel faults.
Greenhouse gases	Gases that increase the temperature of the earth's surface as defined by the United Nations Framework Convention on Climate Change, which include *inter alia* chlorofluorocarbons, carbon dioxide, methane and nitrous oxide.
Groundwater flow	The movement of water through openings and pore spaces in rocks below the water table i.e. in the saturated zone. Groundwater naturally drains from higher lying areas to low lying areas such as rivers, lakes and the oceans. The rate of flow depends on the slope of the water table and the transmissivity of the geological formations.
Hazardous substance	Any substance that is of risk to health and safety, property or the environment. Hazardous substances have been classified under the SABS Code 0288: 'The Identification and Classification of Dangerous Goods and Substances'.
Hazardous waste	Any inorganic or organic element or compound that because of its toxicological, physical, chemical or persisting properties, may exercise detrimental acute or chronic impacts on human health or development. Hazardous wastes are classified in accordance with the 'Minimum Requirement for the Handling, Classification and Disposal of Hazardous Waste' published by the Department of Water Affairs and Forestry (1998).
Heavy water	Water containing a significantly greater proportion of heavy hydrogen (deuterium) atoms to ordinary hydrogen atoms than is found in ordinary (light) water. Heavy water is used to lower the energy of neutrons in a reactor.
Hectopascal	Unit of pressure used in meteorology. One hectopascal equals 100 Pascals (1 hPa = 100 Pa).
Heritage site	A site that contains either archaeological artefacts, graves, buildings older than 60 years, meteorological or geological fossils etc.
High level waste	Radioactive waste that will either be the spent fuel itself (if declared as a waste and intended to be disposed of as such), or the principal waste emanating from the reprocessing of spent fuel. While only 3-4 % of the volume of spent fuel is high-level waste, it holds 95 % of the radioactivity. It contains the highly radioactive fission products and some heavy elements with long-lived radioactivity.
Hummocking	Refers to lumpy terrain; or land that has an irregular shape; or a fertile, wooded area that is at a slightly higher elevation (less than 3 m or so) than nearby marshes.
Hydroperiod	The length of time (and seasonality) that water is present over the surface of the wetland.
Intergranular aquifer	Groundwater contained in intergranular interstices of sedimentary and weathered formations.
Intermediate level waste	Contains higher amounts of radioactivity and may require special containment. It typically comprises resins, chemical

	sludges and reactor components, as well as contaminated materials from reactor decommissioning.
Invertebrate	Animals without backbones or internal bony skeletons. All animals except for the phylum Chordata (vertebrates) fall into this category, including insects, crustaceans, worms, corals, and mollusks.
Irreplaceable	Impossible to replace.
Light water	Ordinary water composed of two hydrogen atoms and one oxygen atom.
Liquefaction	The process by which sediment that is very wet starts to behave like a liquid. Liquefaction occurs because of the increased pore pressure and reduced effective stress between solid particles generated by the presence of liquid. It is often caused by severe shaking, especially that associated with earthquakes.
Load Shedding	An intentionally engineered electrical power outage caused by insufficient available resources to meet the prevailing demand for electricity.
Low level waste	It comprises paper, rags, tools, clothing, and filters etc., which contain small amounts of mostly short-lived radioactivity. LLW is not dangerous to handle, but needs to be disposed of more sensitively than normal waste.
Mesozoic	Period from 65 –150 million years ago.
Neoproterozoic	The Neoproterozoic is the geological era from 1000 Ma to 542 Ma (million years ago).
Near Threatened	The status of a species that does not satisfy the IUCN criteria for Vulnerable, Endangered or Critically Endangered, but is close to qualifying, or is likely to qualify for a threatened category in the near future.
Power outage	Equipment failure resulting when the supply of power fails.
Palaeontology	The study of prehistoric life forms on Earth through the examination of plant and animal fossils.
Palaeoseismic evidence	Refers to earthquakes recorded geologically, most of them unknown from human descriptions or seismograms. Geologic records of past earthquakes can include faulted layers of sediment and rock, injections of liquefied sand, landslides, abruptly raised or lowered shorelines, and tsunami deposits.
Palaeoseismology	The study of prehistoric earthquakes, especially their location, timing and size.
Parabolic (as of dunes)	Parallel dunes with trailing edges in opposite direction to the wind direction. Can be vegetated or unvegetated.
Peak ground acceleration	A measure of earthquake acceleration. Unlike the Richter magnitude scale Richter magnitude scale, it is not a measure of the total size of the earthquake, but rather how hard the earth shakes in a given geographic area.
Pleistocene	A geologic period usually thought of as the Ice Age, which began about 1.6 million years ago and ended with the melting of the large continental glaciers creating the modern climatic pattern about 11,500 years ago.
Pliocene	A geological epoch that began five million years ago and ended 1.8 million years ago; a period of geologic time seven to two million years ago.
Pollution	The introduction into the environment of any substance by the action of man that is, or results in, significant harmful effects to man or the environment.
Prenatal	Existing or occurring before birth.
Pressurized Water Reactor (Nuclear technology type)	Is moderated and cooled with light water that is not boiled in the reactor. The turbine is driven by steam from the

	steam generator.
Quaternary	The youngest of the geological periods, extending from the end of the Tertiary (qv) 1.6 million years ago up to the present. It is divided into the Pleistocene, and the Holocene, which is the last 10,000 years.
Radiation (nuclear)	Energy that is released by radioactive atoms such as uranium. This type of radiation is called ionizing radiation as it contains sufficient energy to remove electrons from within the material they penetrate, it is this ability that makes this type of radiation harmful to life.
Radioactive waste	Radioactive material in gaseous, liquid or solid form, for which no further use is envisaged and which has the radioactivity in excess of background or exemption levels.
Radionuclide	Any species of an atom that is radioactive.
Relictual	Ancient surviving species, typically restricted to moist, cold habitats, but occasionally arid-adapted.
Renewable resources	A natural resource qualifies as a renewable resource if it is replenished by natural processes at a rate comparable to its rate of consumption by humans or other users. Resources such as solar radiation, tides, and winds are *perpetual resources* that are in no danger of being used in excess of their long-term availability.
Rift	A long, narrow crack in the entire thickness of the Earth's crust, which is bounded by normal faults on either side or forms as the crust is pulled apart.
Sea level	The level of the ocean's surface. Sea level at a particular location changes regularly with the tides and irregularly due to conditions such as wind and currents. Other factors that contribute to such fluctuation include water temperature and salinity, air pressure, seasonal changes, the amount of stream runoff, and the amount of water that is stored as ice or snow.
Sea state	A scale that categorizes the force of progressively higher seas by wave height. This scale is mathematically co-related to the Pierson-Moskowitz scale and the relationship of wind to waves.
Seismic hazard	The physical effects such as ground shaking, faulting, land sliding, and liquefaction that underlie the earthquake's potential danger.
Seismicity	Earthquake activity.
Seismotectonic region	A region within which the active geologic and seismic processes are considered to be relatively uniform.
Spent Fuel	Nuclear fuel elements that are discharged from a nuclear reactor after they have been used to produce power. Spent fuel is thermally hot and highly radioactive.
Stone Age	The earliest technological period in human culture when tools were made of stone, wood, bone, or antlers. Metal was unknown. The dates of the Stone Age vary considerably from one region to another.
Stratification	The existence or formation of distinct layers in a body of water identified by differences in thermal or salinity characteristics (e.g. densities) or by oxygen or nutrient content.
Taxon	A means of referring to a set of animals or plants of related classification. Plural form of taxon is taxa.
Tertiary	Period from 65 -1.6 million years ago; The first period of the Cenozoic era (after the Mesozoic era and before the Quaternary period), spanning the time between 65 and 1.8 million years ago.

Threatened	Term used in its formal sense to denote one of the three categories of threat, as defined by the IUCN, viz., Critically Endangered, Endangered and Vulnerable.
Transpressional	Refers to a specific form of geological shearing. Geological shears relate to the structure of the geology, rocks and faults.
Uranium	A naturally radioactive and very dense element. Natural uranium contains 0.7 % of the isotope Uranium-235, needed for fission. Uranium enriched to 3-5 % in the isotope Uranium-235, is the principal nuclear fuel material used in today's nuclear power reactors.
Vertebrate	An animal with a backbone; includes mammals, birds, reptiles, amphibians, and fishes.
Volatile organic compounds (VOCs)	Organic chemicals all contain the element carbon (C); organic chemicals are the basic chemicals found in living things and in products derived from living things such as coal, petroleum, and refined petroleum products.
Vulnerable	The status of a species that has satisfied the IUCN criteria that indicate that it faces as a high risk of extinction in the wild.
Wetland	Lands where saturation with water is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface.