Our reference: SO-ENV-1347

29 November 2024

Your Ref: EA nr EM1/1/(c)/00/82

Department of Economic, Small Business Development, Tourism and Environmental Affairs
113 Saint Andrews Street,
St Andrews Building
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Bloemfontein
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Attention: Deputy Director: Environmental Impact Assessment

ENVIRONMENTAL AUTHORISATION EXTERNAL REPORT SUBMISSION

The Environmental Authorisation applicable for Sasol South Africa Limited, Sasolburg Operations was externally audited during November 2022. The external audit was conducted to comply to the requirement contained in Chapter 5 part 3 of the Environmental Impact Assessment Regulations.

Sub regulation 34 (6) of the regulations also requires the holder of the environmental authorisation to notify all potential and registered interested and affected parties of the submission of the report and make the report available on request to anyone and on a publicly accessible website, where available.

The external audit reports will be available on https://www.sasol.com/esg/environmental-audit-reports.

Sasolburg Operations appointed WSP to conduct the external audits on all Environmental Authorisations and accompanying Environmental Management Programs.

Attached, please find the compliance audit report for the Butanol Complex authorisation with reference EM1/1/(c)/00/82, dated May 2023.

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The Audit report noted sufficient mitigation of environmental impacts and level of compliance to the Environmental Authorisation and Environmental Management Program (EMPr) therefore no recommendations for improvement were made.

Further, in alignment with Chapter 5 Part 4 of the regulation, regulation 36 allows amendment to the impact management action of an EMPr to be affected immediately by the holder of the environmental authorisation and reflect it in the next environmental audit report. Annexure B contains the mitigations measures identified during the environmental impact assessment, for the operational phase of the project, defining the impact management outcome and impact management actions to enable compliance to this regulation.

No impact management outcome or impact management action requires amendment for the Butanol Complex

Yours faithfully

Signed by: Johann Van Wyk
Signed at:2024-12-03 07:35:02 +02:00
Reason:I approve

Johann Van Wyk

Johann van Wyk
Senior Manager Environment and Product Stewardship (acting)

Tel: +27 16 960 2398
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Annexure A

Audit report.

Butanol complex– ref [EM1/1/c)/00/82]

Sasol South Africa Ltd

BUTANOL COMPLEX ENVIRONMENTAL AUTHORISATION (REFERENCE: EM1/1(C)/00/82) AND EMPR

Audit Report: November 2019 - November 2022

SASOL SASOLBURG EA AUDITS
MAY 2023

CONFIDENTIAL

Sasol South Africa Ltd

BUTANOL COMPLEX ENVIRONMENTAL AUTHORISATION (REFERENCE: EM1/1(C)/00/82) AND EMPR

Audit Report: November 2019 - November 2022

TYPE OF DOCUMENT (VERSION) CONFIDENTIAL

PROJECT NO. 41104347

OUR REF. NO. SASOL SASOLBURG EA AUDITS

DATE: MAY 2023

Sasol South Africa Ltd

BUTANOL COMPLEX ENVIRONMENTAL AUTHORISATION (REFERENCE: EM1/1(C)/00/82) AND EMPR

Audit Report: November 2019 - November 2022

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QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
Remarks	Final EA Audit Report			
Date	May 2023			
Prepared by	Takadzani Takalani			
Signature				
Checked by	Ian Malloy			
Signature				
Authorised by	Anri Scheepers			
Signature				
Project number	41104347			
Report number	1			
File reference	\\corp.pbwan.net\za\Central_Data\Projects\41100xxx\41104347 - Sasol Sasolburg EA Audits\41 PA\01-Reports\02-Final\BUTANOL			

SIGNATURES

PREPARED BY

Takadzani Takalani

Senior Consultant

REVIEWED BY

Ian Malloy
Senior Environmental Consultant

This Environmental Authorisation Audit report (Report) has been prepared by WSP Group Africa (Pty) Ltd (WSP) on behalf and at the request of Sasol South Africa Limited (Client), to comply with the environmental audit requirements provided for in Regulation 34 of the EIA Regulations, 2014.

Unless otherwise agreed by us in writing, we do not accept responsibility or legal liability to any person other than the Client for the contents of, or any omissions from, this Report.

To prepare this Report, we have reviewed only the documents and information provided to us by the Client or any third parties directed to provide information and documents to us by the Client. We have not reviewed any other documents in relation to this Report, except where otherwise indicated in the Report.

PRODUCTION TEAM

SASOL SASOLBURG

SHE: Environment Specialist	Suyen Van Zyl
Area Manager	Uresh Naidoo
Area Manager	Lerata Mofokeng
Foreman Production Butanol	Johan Pretorius

WSP

Auditor	Takadzani Takalani
Auditor	Matilda Mbazo
Lead Auditor	Ian Malloy
Project Director / Quality Assurance	Anri Scheepers

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1 INTRODUCTION

1.1 TERMS OF REFERENCE

WSP Group Africa (Pty) Ltd (WSP) as an independent environmental consultant was appointed by Sasol Chemicals a division of Sasol South Africa Limited to undertake an external environmental compliance audit of the commitments contained in the Environmental Authorisation (EA) of the Butanol Complex - EM1/1(c)/00/82 and Environmental Management Programme (EMPr), and compile an audit report according to the requirements of the National Environmental Management Act (No. 107 of 1998), as amended (NEMA).

The details of the EA (initially Record of Decision (RoD)), the amendment of the EA and the EMPr audited for compliance for the establishment of the Butanol Complex at the Sasol One Site are provided below:

- The Record of Decision with Ref: EM1/1(c)/00/82 granted on 26 March 2001 by the Free State Department of Environmental Affairs and Tourism for the proposed construction and operation of a butanol plant;
- Amendment of EA for proposed Butanol complex dated 29 June 2018;
- Amendment of EA for proposed Butanol complex dated 22 October 2019; and
- Final EMP for proposed Butanol Project dated December 2000 report (document nr. 275635/4).

Sasol Sasolburg applied to amend the EA (reference number: EM1/1(C)/00/82); as per Regulation 30(2) of GNR 982, 2014 Environmental Impact Assessment (EIA) Regulations.

DESTEA, the competent authority, granted:

- Application for amendment of EA for proposed Butanol complex dated 29 June 2018;
- Application for amendment of EA for proposed Butanol complex dated 22 October 2019;
- Application for EMPr Amendment - Exemption Application:SO-env-620: Butanol Complex dated 01 February 2021 (file name: Response from Gauteng on 2019 Audit) – Condition 2.2 of the EMPr was removed.

The external audit was undertaken in accordance with Regulation 34 of the Environmental Impact Assessment (EIA) Regulations, 2014 published in terms of the National Environmental Management Act 107 of 1998 (NEMA). This audit report considers the period August 2019 to November 2022.

1.2 SASOL SASOLBURG – BUTANOL OPERATIONS

Sasol South Africa Ltd acting through its Sasolburg Operations constructed and operates a plant, which produces n-Butanol and iso-Butanol. Normal butanol (n-butanol) and its isomer (iso-Butanol) are organic alcohols with similar molecular mass but different molecular structures. The Butanol Complex consist of a Syngas Conditioning Unit, A Butanol Plant, a Cooling Tower and a Flare Stack. This description was adopted from the EA activity description.

1.2.1 THE SYNGAS CONDITIONING UNIT (CRYOGENIC UNIT)

This unit consists of the carbon dioxide removal unit employing an amine wash and finally compressing the gas feed to desired pressures. The gas is then passed through a drying unit. This consists of a gas compression unit.

1.2.2 BUTANOL PLANT AND ATR PLANT

The Syngas from Rectisol Plant in Sasolburg, 95% w/w Propylene from Secunda and 99.9% w/w Hydrogen from the existing Hydrogen Purification Plant (PSA) within Sasol are reacted in the presence of a catalyst (Rhodium) in a chemical (OXO) reactor to produce the two butyl-aldehydes. This mixture is fed to a distillation column for separation. Distillates are hydrogenated as indicated on the graphic insert below, to form butanol. The separated iso-butyl-aldehyde isomers are reacted with hydrogen in the presence of a nickel catalyst to produce normal-butanol and iso-butanol.

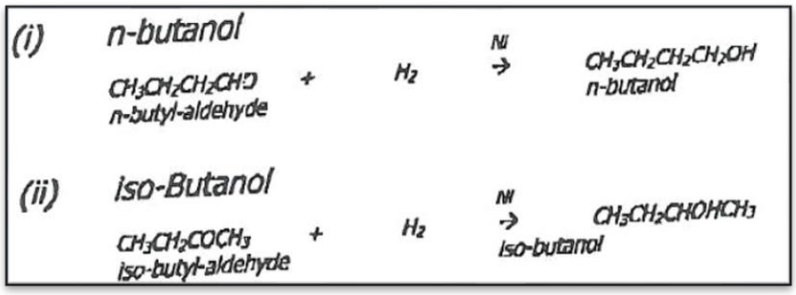

Figure 1-1 - Hydrogenrated distillates that form Butanol

1.2.3 A FLARE STACK

The unreacted propylene and butyl-aldehyde from the OXO reactor as well as any off-gas from the system will be routed to the flare stack.

1.2.4 EFFLUENT TO DAMS

As the reactions are exothermic (generate heat), cooling water is used. All liquid effluent from this reaction goes to an oil water separation tank and from there it goes to the Bioworks facility for treatment on the Sasol One site.

The Butanol Complex is currently operational and thus the audit findings on **Table 4-1** below presents findings specifically for the operational phase. Other conditions that are applicable to the pre-construction, construction and rehabilitation phase or removed during an amendment were included in the audit checklist table for completeness of the audit report and have been marked accordingly as either not applicable to the operational phase or condition removed.

The Butanol Plant is within the existing (authorised) Sasol Midlands Operation Site. Refer to **Figure 1-2** for the locality map of the plant.

Figure 1-2 - Sasol Sasolburg site layout

1.2.5 BIOWORKS

Sasol Operations participates in the National Greendrop program for the Sasolburg and Ekandustria Operations (SEO) owned and operated Wastewater Treatment Works (WWTW) known as the Bioworks. The primary purpose of the Sasol Bioworks is to provide the local municipality with sustainable wastewater treatment services under a commercial contract. This is seen to be for the benefit of the local community and ultimately also the Vaal River catchment. All effort is being made to align the Bioworks practices according to the Greendrop guidelines. The Bioworks data is also uploaded on the Integrated Regulatory Information System (IRIS) on a monthly basis. In October 2020, the Department of Water and Sanitation (DWS) audited the WWTW against the Greendrop requirements.

1.2.6 IWWMP

All stormwater and effluent discharge are managed through the Integrated Water and Waste Management Plan (IWWMP). The IWWMP includes details of Integrated Water and Waste Management Plan (IWWMP), Storm Water Management Plan (SWMP), Rehabilitation Strategy and Implementation Plan (RSIP), Water Conservation and Demand Management (WC/DM) (reference: SO-env-929 DWA file number 27/2/2/C222/6/4).

1.3 PROJECT TEAM

Takadzani Takalani and Matilda Mbazo completed a site inspection of the Butanol Plant at Sasol's Midlands Operation Site for EA (ref: EM1/1(c)/00/82) on 10 November 2022.

The draft external audit report was compiled in January 2023 and finalised in February 2023. This report will be submitted to the DETSEA by Sasol in 2023.

Quality assurance is a critically important part of WSP's consulting services which aim to ensure both delivery of high-quality work and provide legal and commercial protection to the company. Quality assurance of this audit report was undertaken by Anri Scheepers.

The project team is summarised in **Table 1-1** and Curricula Vitae are included as Appendix A.

Table 1-1 - Details of the Audit Team

Audit Team	Role	Experience
Ian Malloy	Auditor	BEng Chemical BEng (Hons) Environmental MEng Water Engineering (in progress)
		9 Years' Experience
		Ian is a Senior Environmental Consultant at WSP with over 9 years' experience in the environmental management industry. Ian graduated from the University of Stellenbosch with a BEng in Chemical Engineering in 2016 and a BEng Hons in Environmental Engineering in 2019. He is currently completing a MEng in Water Engineering. Ian has specialised in waste planning, environmental management and auditing, and environmental engineering. Ian has been involved in numerous waste and water management, and construction related projects in South Africa. The projects completed

		include EIAs, Water Use Licence (WUL) and Waste Management Licence (WML) Applications, amendment processes, developing IWMPs for District and Local Municipalities, developing EMPrs, conducting environmental compliance audits of EAs, EMPrs, WULs, and WMLs, conducting GRAP 17 and 19 assessments of landfill sites, and sampling and monitoring of groundwater and marine water.
Takadzani Takalani	Auditor	MSc Environmental and Geographical Sciences
		9 Years' Experience
		Takadzani Takalani graduated from the University of Cape Town with a BSc in Environmental and Geographical Science in 2005 and completed her MSc in the same field in 2012. Takadzani is a Senior Consultant in the Environmental Planning and Advisory Division of WSP based in the Cape Town office. She has worked on BAs, EIAs and ESIAs in South Africa, Uganda, Ethiopia, Namibia and Tanzania as an environmentalist and a social scientist. Takadzani has been mainly involved in projects in the mining sector as well as oil and gas.
Anri Scheepers	Reviewer	BA (Hons) Geography
		10 Years Experience
		Anri has been involved in numerous mining and industrial projects in South Africa. The projects include ESIA's, EMPr Environmental Performance Assessments and EMPr consolidation and alignment processes associated. Anri's roles and responsibilities include the management of Basic Assessment Processes, Scoping and Environmental Impact Assessment Reporting Processes, Water Use Licence Application Processes and Waste Licencing Processes and the implementation of ISO 14000 and 9000 systems.

2 AUDIT SCOPE

WSP was appointed by Sasol to conduct the environmental compliance audit for Butanol Complex facility. This report provides an overview of the level of compliance with the conditions contained in the EA and EMPr. The site audit was undertaken on 10 November 2022 at the Sasol One, Sasolburg Plant. This audit is designed to meet the requirements of Regulation 34 of the EIA Regulations, 2014, as amended.

The objective of the audit was to:

- Assess the level of compliance with the commitments of the EA (EM1/1(c)/00/82) for the Butanol Plant;
- Assess the level of compliance with the commitments of the EMPr that was submitted as part of the Scoping Report for the licencing of the Butanol Plant;
- Assess the extent to which the avoidance, management and mitigation measures provided for in the EMPr for the operation of the Butanol Complex were implemented;
- Identify and assess any new impacts and risks that result from undertaking the activity;
- Critically evaluate the effectiveness of the EA;
- Identify shortcomings in the EA and EMPR; and
- Identify the need for any changes to the avoidance, management and mitigation measures provided for in the EA.

As a result, the EIA Regulations are considered applicable to the Sasolburg Butanol Operations. Regulation 34, of the EIA Regulations, provides for the auditing of an environmental authorisation, EMPR and closure plan. Furthermore, Appendix 7 of Government Notice Regulation (GNR) 982 outlines the required audit report content. The 2014 Regulations refer to a minimum frequency of five years however, the EMPR refers to a more frequent auditing requirement which supersedes the 2014 Regulations. **Table 2-1** indicates where the requirements of Section 34 and Appendix 7 are met within this audit report.

The Butanol Complex EMPr report gives the name of the impact, the main objectives of the impact as well as the impact management principles or actions. The audit tables (**Table 4-1** and **Table 4-2**) will focus on the impact management actions as auditable actions indicated for each impact on the EMPr.

Table 2-1 - Regulation 34 and Appendix 7 of the EIA Regulations (2014), as amended

Sub-Section	Requirement	Report Section Reference
34 (2)a	The environmental audit report must be prepared by an independent person with the relevant environmental auditing expertise.	**Sub-section 1.3** CVs provided in **Appendix A**
34(2)b	The environmental audit report must provide verifiable findings, in a structured and systematic manner, on: (i) the level of performance against and compliance of an organisation or project with the provisions of the requisite	Audit checklist tables provided in **Section 4**

Sub-Section	Requirement	Report Section Reference
	environmental authorisation or EMPr and, where applicable, the closure plan; and (ii) the ability of the measures contained in the EMPr, and where applicable the closure plan, to sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity;	
3(a)	The environmental audit report must determine (a) the ability of the EMPr, and where applicable the closure plan, to sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity on an ongoing basis and to sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the closure of the facility; and	**Section 4**
3(b)	The environmental audit report must determine the level of compliance with the provisions of environmental authorisation, EMPr and where applicable, the closure plan.	**Section 4**
4(a)	Where the findings of the environmental audit report indicate: (a) insufficient mitigation of environmental impacts associated with the undertaking of the activity (b) insufficient levels of compliance with the environmental authorisation or EMPr the holder must, when submitting the environmental audit report to the competent authority submit recommendations to amend the EMPr or closure plan in order to rectify the shortcomings identified in the environmental audit report	**Section 4**
a	Details of- (i) the independent person who prepared the environmental audit report; and (ii) the expertise of independent person that compiled the environmental audit report.	**Sub-section 1.3** CVs provided in **Appendix A**
b	A declaration that the independent auditor is independent in a form as may be specified by the competent authority.	**Sub-section 8**
c	An indication of the scope of, and the purpose for which, the environmental audit report was prepared.	**Sub-section 1.1** and **Section 2**
d	A description of the methodology adopted in preparing the environmental audit report.	**Section 3**
e	An indication of the ability of the EMPr, and where applicable, the closure plan to- (i) sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity on an on-going basis;	**Section 4** and **sub-section 4.3**

Sub-Section	Requirement	Report Section Reference
	(ii) sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the closure of the facility; and (iii) ensure compliance with the provisions of environmental authorisation, EMPr, and where applicable, the closure plan.	
f	A description of any assumptions made, and any uncertainties or gaps in knowledge.	**Sub-sections 2.1** and **2.2**
g	A description of any consultation process that was undertaken during the course of carrying out the environmental audit report.	**Sub-section 3.2**
j	A summary and copies of any comments that were received during any consultation process.	Comments received during the consultation process were included as comments in the audit checklist tables in **Section 4**
k	Any other information requested by the competent authority.	None requested

2.1 DISCLAIMER

This Report has been prepared by WSP on behalf and at the request of Sasol in terms of Regulation 34 of the EIA Regulations.

Unless otherwise agreed by us in writing, we do not accept responsibility or legal liability to any person other than the Client for the contents of, or any omissions from, this Report.

To prepare this Report, we have reviewed only the documents and information provided to us by the Client or any third parties directed to provide information and documents to us by the Client. We have not reviewed any other documents in relation to this Report and except where otherwise indicated in the Report.

The findings, recommendations and conclusions given in this report are based on the author's best scientific and professional knowledge, as well as available information. This report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken; WSP and its staff reserve the right to modify aspects of the report including the recommendations if and when new information may become available from on-going research or further work in this field or pertaining to this investigation.

Although WSP exercises due care and diligence in rendering services and preparing documents, WSP accepts no liability, and Sasol, by receiving this document, indemnifies WSP and its directors, managers, agents and employees against all actions, claims, demands, losses, liabilities, costs,

damages and expenses arising from or in connection with the services rendered, directly or indirectly by the use of the information contained in this document.

This report must not be altered or added to without the prior written consent of the author. This also refers to electronic copies of this report which are supplied for the purposes of inclusion as part of other reports. Similarly, any recommendations, statements or conclusions drawn from or based on this report must make reference to this report. If this report is used as part of a main report, the report in its entirety must be included as an appendix or separate section to the main report.

2.2 ASSUMPTIONS AND LIMITATIONS

WSP noted the following assumptions and limitations during the audit:

- The information provided by Sasol is up to date and accurately represents the Sasol Sasolburg operations;
- WSP viewed as much of the operational area as possible given the timeframe and access limitations;
- Findings made within the previous audit reports are correct; and
- Site photographs were not provided in the audit report due to the onsite Sasol Sasolburg policy that disallows any photographs being taken on site. Where conditions were deemed compliant, and the evidence provided was onsite observation and verbal confirmation to support the findings; this was observed by the Auditors.

This Report has been prepared by WSP at the request of Sasol South Africa Ltd and the Terms of Reference as detailed in **Section 1.1**.

Unless otherwise agreed by us in writing, we do not accept responsibility or legal liability to any person other than the Client for the contents of, or any omissions from, this Report.

3 AUDIT METHODOLOGY

The International Organisation of Standardisation (ISO) 14010, ISO 14011 and ISO 14012 guideline documents were utilised as a template during the compliance audit process. This methodology ensures that the compliance audit was conducted in a systematic and independent manner that was documented and objectively evaluated to determine compliance to the EA commitments.

The audit process comprised the following:

- Confirmation of the audit checklist;
- Site inspection (10 November 2022);
- Review of documentation relevant to the commitments of the EA and EMPr (e.g. records, permits, certificates, maintenance logs, monitoring results, previous audit reports, specialist reports, etc.); and
- Compilation of an audit report.

3.1 AUDIT CHECKLIST

WSP compiled a checklist of the report commitments, which was used as an auditing compliance tool. **Table 4.1** and **Table 4.2** were compiled using the audit checklist as a base.

3.2 SITE INSPECTION AND INTERVIEWS

An onsite inspection was conducted on 10 November 2022, where findings and observations were recorded and are summarised in Section 4. Key personnel interviewed included:

- Suyen Van Zyl;
- Uresh Naidoo;
- Lerata Mofokeng; and
- Johan Pretorius.

3.3 INFORMATION CONSIDERED

Information related to the following categorises was reviewed, where required, and used to evaluate compliance:

- The Record of Decision with Ref: EM1/1(c)/00/82 granted on 26 March 2001 by the Free State Department of Environmental Affairs and Tourism for the proposed construction and operation of a butanol plant;
- Application for amendment of EA for proposed Butanol complex dated 29 June 2018;
- Application for amendment of EA for proposed Butanol complex dated 22 November 2019;
- Application for EMPr Amendment - Exemption Application:SO-env-620: Butanol Complex dated 01/02/2021 (file name: Response from Gauteng on 2019 Audit) – Condition 2.2 of the EMPr was removed.
- Final EMP for proposed Butanol Project dated December 2000 report nr. 275635/4;
- External audits of EA (ROD) and EMPRs: Midland: Butanol Complex – Final Audit Report (CEM2019/007) dated July 2019;
- Internal audit and monitoring reports;
- Air Quality Management and Audits;

- Atmospheric Emission Licence (AEL) by Fezile Dabi Local Municipality. AEL License number: FDDM-MET-2013-24-R1;
- FY22 Annual Emission Report was submitted for reporting period from July 2021 – June 2022;
- Integrated Water and Waste Management Plan (IWWMP) Rev 1 – report number: SO-env-929 (Sasolburg Operations, December 2021) that includes the:
  - Stormwater Management Plan (SWMP, 2021);
  - Rehabilitation Strategy and Implementation Plan (RSIP);
  - Water Conservation and Demand Management (WC/DM);
  - Malfunctions register;
  - Water management;
  - Groundwater management;
  - Waste management;
  - Contaminated Water and Wastewater Management;
  - Effluent Management; and
  - Land management.
- Sasolburg and Ekandustria Operations ISO 45001:2018, ISO 9001:2015 and ISO 14001:2015 Recertification Audit Report (DQS Management Systems Solutions, November 2021);
- Procedure for the management of waste on the Sasolburg Operations' Sites (document number: SSP-S-014) (Sasolburg Operations, October 2020)
- The reporting, investigation and recording of environmental incidents (document number: SSP-S-013) (Sasolburg Operations, July 2019);
- Various email correspondence to confirm details on site.
- Waste Management Documents and Disposal Registers;
- Standard Operating Procedures;
- Other related approvals.

3.4 ASSESSMENT EVALUATION METHODOLOGY

The consolidated report contains all commitments, which were formulated as part of the original EA, EMPr and addendum approvals. Each commitment contained in the audit checklist was assessed by reviewing site documentation, interviewing employees, and undertaking a site inspection. The application of the EA and EMPR was assessed, and the level of compliance rated (compliance categories contained in **Table 3-1**). The compliance of each of the operations listed in **Section 1.1** was assessed.

Table 3-1 - Levels of Compliance

Compliance Level	Definition
Compliant (C)	When an activity or commitment has been implemented, completed, is on-schedule or is maintained on an ongoing basis. Condition/mitigation measure/commitment has been achieved with evidence provided in the form of a document or site verification.
Non-compliant (NC)	When an activity or commitment has not been complied with in its entirety/certain aspects thereof have not been addressed.

	When a commitment has not been undertaken, not been completed according to plan, or where any unlawful actions have been identified. Non-compliant conditions are given target completion dates as follows: — Short term: 0 – 6 months. — Medium term: 6 – 12 months. — Long term: 12 - 18 months
Not applicable (N/A)	The condition, commitment and/or mitigation measure is not applicable or is to be revised in accordance with current practice. A “Not Applicable” finding is also noted in event where such condition, commitment and/or mitigation measure is not yet relevant but is still relevant for future activities.

Other conditions such as those in the pre-construction, construction phase or removed during an amendment having been included for the completeness of the audit report and have been marked accordingly as either not applicable or condition removed. All conditions that were not included in previous audits have been audited and these are reflected in Section 5 which compares progress against audit findings.

4 AUDIT FINDINGS

4.1 Environmental Authorisation

Table 4-1 below provides the compliance of Sasol with the conditions within the EA and amendments to the EA.

Table 4-1 - Environmental Authorisation EM1 /1(c)/00/82– Audit Findings for Butanol Complex

Ref	Condition	Compliance Status	Findings/Evidence	Recommendations, Timeframe & Responsible Person
Location				
	Work will be done, within the Midland site, on Portion 3, of the farm Driefontein 2, Heilbron RD in the Sasolburg Magisterial district.	**N/A**	This item was amended in the 2018. This is not an auditable condition.	None
Applicant				
	Mr. Rightwell Laxa, SVP Sasolburg Operations Sasol South Africa Ltd acting through its Sasolburg Operation, PO Box 1 Sasolburg, 1947, Tel: 016 960 8001	**N/A**	This was amended in the 2019 amendment. This is not an auditable condition.	None
Special Conditions				
(i) (a)	i) Air pollution -a) Emission monitoring is done in terms of the applicable Sasol Operation Atmospheric Emission License (AEL)	**C**	Sasolburg Operations has been granted the Atmospheric Emission Licence (AEL) by the Fezile Dabi Local Municipality. SASOL is required to submit its annual atmospheric emissions compliance report 60 days after the closure of its financial year end. *Evidence*: ▪ Atmospheric Emission Licence (AEL) by Fezile Dabi Local Municipality. AEL License number: FDDM-MET-2013-24-R1	None

Ref	Condition	Compliance Status	Findings/Evidence	Recommendations, Timeframe & Responsible Person
			▪ FY22 Annual Emission Report was submitted for reporting period from July 2021 – June 2022. Compliance with the AEL for the Butanol Plant in this reporting period was concluded.	
(i) (b)	i) Air pollution - b) Once the plant is operational, monitoring of the amines will be done to ensure the absolute perception limit (APL) is not exceeded. On exceeding the APL, the appropriate a action (as may be convincing to permit authorities) will be taken by SCI.	**N/A**	Condition removed in the 2018 amendment and therefore no longer applicable.	None
(i) (c)	i) Air pollution -c) No uncontrolled venting of butanol will be allowed. If it is necessary to do so, this will be limited to conditions of good dispersion potential during shutdown, such as windy daytime atmosphere	**C**	The Butanol facility is a closed system that contains product within the facility. The design of the system allows no uncontrolled venting of n-butyraldehyde or iso-butyraldehyde and therefore venting of butanol is not possible. Compliance with the AEL for the Butanol Plant in the July 2021 – June 2022 reporting period was concluded. *Evidence*: ▪ Onsite Communication ▪ Report: FY22 Annual Emission Report (July 2021 – June 2022)	None
(ii)	(ii) Storm water and Effluent Disposal: (a) All storm water that may be contaminated with chemicals (due to leakages), must be directed to bio-works.	**C**	The auditor was informed that all stormwater that may be contaminated, including rainwater falling on operational areas, is channelled to Bioworks. All stormwater and effluent discharge are managed through an IWWMP as well as the Design Basis. These were provided to the auditor. *Evidence:* ▪ Onsite Communication ▪ IWWMP = Integrated Water and Waste Management Plan (IWWMP), Storm Water Management Plan (SWMP), Rehabilitation Strategy and Implementation Plan (RSIP), Water Conservation and Demand Management (WC/DM) Ref: SO-env-929 DWA file number 27/2/2/C222/6/4	None

Ref	Condition	Compliance Status	Findings/Evidence	Recommendations, Timeframe & Responsible Person
			▪ Design basis. Butanol. Sewer System UAN:61-6320 (dated 01/08/2002)	
(ii) (b)	(ii) Storm water and Effluent Disposal: (b) The firefighting run off will be sampled and analysed before disposal to determine (depending on its quantity and quality) the appropriated disposal site.	C	The auditor was informed that storm water and fire runoff is sampled and analysed before disposal annually. No fire was recorded in the butanol plant during the audit period, since December 2021, and therefore no sampling results and analysis are available. *Evidence:* ▪ Onsite verification and communication ▪ This procedure is available for management of firefighting run-off: SSP-S-050_(Rev4) Fire Water Reticulation System Isolations.	None
(ii) (c)	iii) Storm water and Effluent Disposal: (c) Cooling tower blow-down and other sour process water, must be disposed of in the appropriate waste dams.	C	The liquid water effluent from the cooling system is routed to the appropriate water effluent dams and the other sour process effluent water from the reaction sections goes to an oil-water separation tank and from there it goes to the Bioworks facility which is located at the Sasol One site. *Evidence*: ▪ Onsite communication	None
Special Conditions (iii) (a)	iii) Other effluents and solid waste a) All tanks containing process chemicals (chemicals used in the manufacturing / process at the plant) must be properly bunded and their run-off appropriately diverted.	C	This condition was amended in 2018. The area with process chemicals is properly bunded and the surrounding area is well-paved and sloped to ensure process chemicals are channelled to sumps. The bund capacity is 110% of the largest tank in the bund. Bund wall calculation was provided for audit purposes. *Evidence:*	None

Ref	Condition	Compliance Status	Findings/Evidence	Recommendations, Timeframe & Responsible Person
			▪ Onsite verification and communication ▪ Stormwater Management Plan compiled in 'IWWMP' report is used to manage this area	
(iii) (b)	iii) Other effluents and solid waste b) Spent catalyst must be disposed of by a specialist waste contractor at a licensed waste site	C	Spent catalyst was disposed of during shutdowns by a registered service provider (Enviroserv Pty Ltd in the 2018 shutdown) to a registered hazardous waste site (Holfontein). Safe disposal certificates are kept as proof. A waste management procedure is also adhered to for this operation. The last shutdown was in 2018 and the next planned shutdown is in 2023. *Evidence:* ▪ Onsite communication ▪ SSP-S-014 (5) - Procedure for the management of waste on the Sasolburg Operations_ Sites ▪ Safe Disposal Certificate – Manifest # 0002268118 (EnviroServ)	None
(iii) (c)	iii) Other effluents and solid waste c) Guard-beds may be replaced during shutdown and must be disposed of by a specialist waste contractor at a licenced waste site.	C	Guard-beds is only disposed of during shutdowns by a registered service provider (Enviroserv Pty Ltd in the 2018 shutdown) at a registered hazardous waste site (Holfontein). Safe disposal certificates are kept as proof. A waste management procedure (SSP-S014) is also adhered to for this operation. Waste register for n-Butanol was shared with the auditor. Guard beds disposal certificate was not provided for auditing; however, this was outside the audit period. The last shutdown was in 2018 and the next planned shutdown is in 2023. *Evidence*: ▪ Onsite communication	Guard beds certificate to be kept onsite as proof and provided for the next audit. This was not provided in the 2019 audit and not provided for this audit.

Ref	Condition	Compliance Status	Findings/Evidence	Recommendations, Timeframe & Responsible Person
			▪ SSP-S-014 (5) - Procedure for the management of waste on the Sasolburg Operations_ Sites ▪ Midlands Operations (MO) Waste Register (21 August 2019)	
(iii) (d)	iii) Other Effluent and solid waste d) The horizontal flare knock out drum must be emptied DURING SHUTDOWNS. Solid content of the knockout drum will be disposed of by a specialist waste contractor in a licensed hazardous waste site.	C	The horizontal flare knock out drum is emptied during shutdown (next shut down date is during 2023). Sasol Sasolburg operations have the waste management procedure (SSP-S-014) that is adhered to. Competent service providers were appointed to remove the waste from site. Safe disposal certificates are kept onsite. *Evidence:* ▪ Onsite communication ▪ SSP-S-014 (5) – Procedure for the management of waste on the Sasolburg Operations_ Sites ▪ Safe Disposal Certificate – Manifest # 0002258374 dated 26/09/2018 (Enviroserv)	None
Special Conditions (iv)	iv) Noise – while noise generation equipment must be fitted with silencers, Sasol will comply with Health and Safety Legislation that an overall noise rating level in areas where more than one noise source is place is less than 85 dB.	C	Two noise reports were shared with the auditor: Both reports confirmed Butanol and Utilities as noise areas i.e., exceeding 85dBA, also verified during site visit. It was recommended and mentioned on site that silencers were installed to reduce the noise level. Both compressors (KC101 and KC 301) which generate more noise are housed inside noise hood to minimise noise. *Evidence:*	None

Ref	Condition	Compliance Status	Findings/Evidence	Recommendations, Timeframe & Responsible Person
			  **Photos: Silencer cover** ▪ Onsite communication and verification ▪ Noise Survey and Impact Assessment for Hearing Conservation Purposes (Project No. SEO-090-2021-TM-N dated 20 January 2022). ▪ Environmental Noise Survey for Sasol Sasolburg, Steam Station 2, SGEPP, Sasol One, Midlands & Bunsen Area (2019) – GIJ – Report – 24539 Rev 00. Photographs of noise generating cover.	
Special Conditions (v)	v) Transport of Hazardous material: Sasol will ensure that its contractors adhere to the requirements of The Hazardous Substances Act (Act 15 of 1973), The	C	Sasol outsources this to Chemicals Africa who appointed Barloworld to manage logistics. Adherence to these laws is ensured through training of drivers and live inspection system that	*OFI*:

Ref	Condition	Compliance Status	Findings/Evidence	Recommendations, Timeframe & Responsible Person
	Occupational Health and Safety Act (Act 85 of 1993), and The National Road Traffic Act (Act 93 of 1996).		checks all documentation from contractors/transporters upon entry at Sasol at all times. Recording of transport related incidents, non-compliances, operational loading deviations is also carried out. An incident was noted in this audit which was recorded as: *N-Butanol spill at the Coalplex gate due to a tanker's top lid not sealing properly. Tanker was returned to the tanker bay.* The recording of these incidents can be simplified and properly filed for auditing purposes. The auditor had to query to find out the close out action of the incident as it was not clear on the incident register. *Evidence*: ▪ Emailed correspondence ▪ Spreadsheet with incident reporting of Transport KPIs_Jul 22	This condition can be assessed for operational phase as hazardous material are transported during operations. Applicable to future audits.
Special Conditions (vi) (1)	vi) Safety – (1) It is normal industrial practice that CO_2 removal (Benfield) units, employ a Potassium Carbonate (K_2CO_3) wash before the amine wash. Inclusion of a K_2CO_3 system requires in most instances the use of hazardous substances such as vanadium pentoxide (V_2O_5) for rejuvenating the carbonate.	**N/A**	Condition removed as per the 2018 amendment (approved 29/06/2018).	None
(vi) (2)	vi) Safety - (2). Oxidising agents such as V_2O_5, will not be used as they shall not have been subjected to a scoping exercise.	**N/A**	Condition removed as per the 2018 amendment (approved 29/06/2018).	None
(vi) (3)	vi) Safety - (3). Proper protective clothing may not be enough if operators are not informed about hazards of the dust.	**C**	All the contractors/service providers that entered the Sasolburg operation receive the Sasol induction (online or/and upon arrival), and the site-specific induction for the areas they are providing services. The induction modules include the PPE required in the area.	None

Ref	Condition	Compliance Status	Findings/Evidence	Recommendations, Timeframe & Responsible Person
			In addition, the induction module for the Butanol plant covers EA conditions and management action. Evidence: ▪ Onsite verification and communication ▪ Safety OTMs AAA and Butanol Plants SO-SHE OTM-009 Rev 1 (effective date 12.08.2019 and this was viewed onsite.	
(vi) (4)	vi) Safety – (4).Di-ethanol amine exists under ambient temperatures as a hard solid. This requires heating to fluid-form before introduction into wash systems. Normal industrial practice is to heat the container with a steam hose.	N/A	Condition removed as per the 2018 amendment (approved 29/06/2018). *Evidence*: ▪ ROD Amendment – Butanol Complex (dated 18/06/2018)	None
(vi) (5)	vi) Safety: (5) The anti-foaming agent is dosed manually.	C	Noted. Condition amended as per the 2018 amendment (approved 29/06/2018). The dosing facility is partially automated although the antifoaming agent is dosed manually. *Evidence*: ▪ Onsite communication ▪ ROD Amendment – Butanol Complex (dated 18/06/2018)	None
(vi) (6)	vi) Safety – (6). In the event of a conventional, manual system-, sound safety procedures compliant to the Safety Act (when handling substances at high temperatures) must at all times be observed	C	The condition is noted, and this aspect is managed by the Sasol occupational health and safety department. However, a SHE Audit for SEO was done by DQS for 2021. Evidence: Audit Report: recertification audit ISO45001:2008, ISO45001:2008, ISO9001:2015 and ISO14001:2015. Sasolburg and Ekandustria Operations – Main Site with all associated sites. DQS Ref: 352348	

Ref	Condition	Compliance Status	Findings/Evidence	Recommendations, Timeframe & Responsible Person
Special Conditions (vii)	vii) Socio-economic issues - During construction, contractors will largely be drawn from local labour (The Zamdela Unemployment Forum, The Greater Sasolburg Contractors' Association, etc.) while it is acknowledged that limitations due to skills available may exist.	N/A	This condition is outside the audit period and therefore was not audited.	None
	vii) Socio-economic issues-A few new permanent jobs that will be created during operation phase, should be communicated in parallel with conditions for authorisation, as an attempt to improve SCI-community relations and trust.	C	Permanent jobs have been created during operation – vacancies and recruitment plan is in place. *Evidence*: ■ Midland solvents - staff establishment - as on 1st November 2018 - production, electrical and instruments and mechanical included - Blue File October 2018 with vacancies and recruitment plan (MS Excel Sheet) was provided to the auditor but did not indicate improvement to SCI – community relations and trust.	OFI: Evidence provided did not indicate improvement to SCI – community relations and trust and Sasol can endeavour to improve this aspect.
Standard Conditions				
(i)	i) The applicant must advertise this record of decision	N/A	This condition is outside the audit period and therefore was not audited.	None
(ii)	ii)This record of decision does not exempt any person from the requirements of any other controlling authority or from any provision of any other law and does no purport to interfere with the rights of any person who may have an interest in the property.	C	This standard condition is noted. Sasol endeavours to comply with all relevant laws and regulations pertaining to various aspects of the operations such as: ■ Occupational Health and Safety ■ Labour and Employment ■ Transport of Hazardous Material ■ And other applicable laws.	None
Key Factors for the Decision				

Ref	Condition	Compliance Status	Findings/Evidence	Recommendations, Timeframe & Responsible Person
(i)	i) Jobs during construction	N/A	This condition is outside the audit period and therefore was not audited.	None
(ii)	ii) Approximately 14 permanent jobs will be created during operation phase.	C	Midland solvents - staff establishment - as on 1st November 2018 - production, electrical and instruments, and mechanical included - Blue File October 2018 with vacancies and recruitment plan (MS Excel Sheet) was provided to the auditor. An organogram indicating Butanol production staff was provided to the auditor.	None
(iii)	iii) Sasol growth strategy by increasing the range of its oxygenated solvents	N/A	This was provided for informational purposes in the RoD. This condition is not auditable. This key factor is noted. The new plants were constructed to satisfy Sasol's growth strategy for solvents.	None
(iv)	iv) Sasol produces key raw materials for the process. Further processing as is in this endeavour, only adds value to these raw materials	N/A	This was provided for informational purposes in the RoD. This condition is not auditable.	None
(v)	v) The Butanol plant facilitates Sasol's planned diversification into downstream derivatives of n-Butanol such as n-butanyl acetate and n-butanyl acrylate.	N/A	This was provided for informational purposes in the RoD. This condition is not auditable.	None
(vi)	vi) Area in an industrial zone	N/A	This was provided for informational purposes in the RoD. This condition is not auditable.	None
(vii)	vii) Environmental disturbance during the development is inescapable but the effective measures to minimize such disturbances will be taken.	N/A	This condition is noted and the impact management measures/actions in the EMPr as well as the standard operating procedures development bring about effective measures to minimize impact. Not an auditable condition.	None

Ref	Condition	Compliance Status	Findings/Evidence	Recommendations, Timeframe & Responsible Person
Duration of Expiry				
(a)	This permit will continue to be valid for 5 years as long as, a) The development does not pose itself as an environmental hazard.	**C**	The impact management measures/actions in the EMPr as well as the standard operating procedures developed by Sasol have ensured the continual operation of the Butanol Plant and therefore the development is currently not posing itself as an environmental hazard. *Evidence*: ▪ Onsite verification and communication ▪ Sasol submits relevant monitoring and compliance documentation to the competent authorities. Such as the previous external audits of EA (ROD) and EMPRs: Midland: Butanol Complex – Final Audit Report (CEM2019/007) dated July 2019;	None
(b)	This permit will continue to be valid for 5 years as long as: - b) Development shall have started within 2 years from the date of issue of this Record of Decision	**N/A**	The development started within the specified period and is currently operational. This condition is outside the audit period and therefore was not audited.	None
Appeal				
	Should this record of decision be queried, an appeal under section 35(3) of the Environment Conservation Act, may be done in writing within 30 (thirty) days from the date on which this record of decision was advertised and must be directed to: The MEC: Department of Environmental Affairs and Tourism Free State Province P. O. Box 264	**N/A**	This condition is not applicable at this stage as the site is in full operation and there are no appeals. This condition is outside the audit period and therefore was not audited.	None

Ref	Condition	Compliance Status	Findings/Evidence	Recommendations, Timeframe & Responsible Person
	Bloemfontein 9300			

4.2 Environmental Management Programme

Table 4-2 below provides the compliance of Sasol with the conditions within the EMPr and amendments to the EMPr.

Table 4-2 – EMPr: Audit Findings for Butanol Complex: EM1 /1c/00/82

Ref	Condition	Compliance Status	Findings	Recommendations, Timeframe & Responsible Person	Measures Implemented to Address Non-Compliance	Practicality of the EMPR Commitments	Is the Non-Compliance Administrative or will it have an impact?	Historical/New Non-Compliance (Administrative measures)
Air Quality								
2.1	Emission monitoring is done in terms of the applicable Sasol Operation Atmospheric Emission License (AEL) and cumulative impacts will be reported as part of Sasol's permit conditions.	C	This condition was amended in 2018. Sasolburg Operations has been granted the Atmospheric Emission Licence (AEL) by Fezile Dabi Local Municipality. AEL License number: FDDM-MET-2013-24-R1. Sasol is required to submit its annual atmospheric emissions compliance report 60 days after the closure of its financial year end.	None	N/A	N/A	N/A	N/A

Ref	Condition	Compliance Status	Findings	Recommendations, Timeframe & Responsible Person	Measures Implemented to Address Non-Compliance	Practicality of the EMPR Commitments	Is the Non-Compliance Administrative or will it have an impact?	Historical/New Non-Compliance (Administrative measures)
			Evidence: ▪ FY22 Annual Emission Report was submitted for reporting period from July 2021 – June 2022. Compliance with the AEL for the Butanol Plant in this reporting period was concluded.					
2.3 a	a) No uncontrolled venting of n-butyraldehyde or iso-butyraldehyde will be allowed. If it necessary to do so, this will be limited to conditions of good dispersion potential during planned shutdowns, such as windy daytime atmospheres.	C	The Butanol facility is a closed system that contains product within the facility. The design of the system allows no uncontrolled venting of n-butyraldehyde or iso-butyraldehyde and therefore venting of butanol is not possible. *Evidence* ▪ Compliance with the AEL for the Butanol Plant in the July 2021 – June 2022 reporting period was concluded. ▪ Report: FY22 Annual Emission Report (July 2021 – June 2022)	None	N/A	N/A	N/A	N/A
2.3 b	b) Sasol will appropriately notify affected residents of the time and date of planned shutdowns.	C	A broadcast radio message is sent from Sasol's Corporate Affairs. For the previous shutdown in (2018) the message:	None	N/A	N/A	N/A	N/A

Ref	Condition	Compliance Status	Findings	Recommendations, Timeframe & Responsible Person	Measures Implemented to Address Non-Compliance	Practicality of the EMPR Commitments	Is the Non-Compliance Administrative or will it have an impact?	Historical/New Non-Compliance (Administrative measures)
			'Media message: Possible air and noise pollution over weekend' was broadcasted through 90.6FM STEREO/ IFM.102.2 Proof of notification was provided sent to a particular resident given the number of previous complaints and interactions received. *Evidence*: ▪ Onsite communication ▪ Radio broadcast communication slips were provided to the auditor					
2.4	No uncontrolled venting of n-butanol will be allowed. If it is necessary to do so, this will be limited to conditions of good dispersion potential during planned shutdowns, such as windy daytime atmospheres.	C	The Butanol facility is a closed system that contains product within the facility. The design of the system allows no uncontrolled venting therefore venting of butanol is not possible. *Evidence* ▪ Compliance with the AEL for the Butanol Plant in the July 2021 – June 2022 reporting period was concluded. ▪ Report: FY22 Annual Emission Report (July 2021 – June 2022)	None	N/A	N/A	N/A	N/A

Ref	Condition	Compliance Status	Findings	Recommendations, Timeframe & Responsible Person	Measures Implemented to Address Non-Compliance	Practicality of the EMPR Commitments	Is the Non-Compliance Administrative or will it have an impact?	Historical/New Non-Compliance (Administrative measures)
Surface Water								
3.1	3.1 Given the infrequency of monitoring, discharge of the cooling water will be to one of the effluent dams that are not discharging directly to the Taaibosspruit. This will ensure that, in the event of a leak, contamination is contained. The details of how this can be managed will be developed for the SCI East effluent management system.	C	The liquid water effluent from the cooling system is routed to the appropriate water effluent dams. *Evidence:* ▪ Onsite communication ▪ IWWMP (Ref: SO-env-929 DWA file number 27/2/2/C222/6/4) ▪ Solvents SOP: Cooling tower operating overview BuOH-SCU-COOL-SOP-001	None	N/A	N/A	N/A	N/A
3.2	3.2 Should a leak be encountered and one of the dams found to be contaminated, the water will either have to be: - redirected to the Bioworks;	C	All stormwater and effluent discharge are managed through the Storm Water Management Plan (SWMP) in the IWWMP. All stormwater that may be contaminated, including rainwater falling on operational areas, is channelled to Bioworks. It was noted during the audit visit that after heavy rains (which were about 3 days prior to the audit),	None	N/A	N/A	N/A	N/A

Ref	Condition	Compliance Status	Findings	Recommendations, Timeframe & Responsible Person	Measures Implemented to Address Non-Compliance	Practicality of the EMPR Commitments	Is the Non-Compliance Administrative or will it have an impact?	Historical/New Non-Compliance (Administrative measures)
	- aerated to remove some of the COD loading; - or slowly bled into the discharge stream at a rate that will allow discharge requirements to be met; - the correct plan of action will depend on the extent of contamination.		rainwater forms stagnant pools outside the butanol bunded area and seem to take days to drain. It did not look like overflow but perhaps a run-off drain blockage. *Evidence*: ▪ Onsite communication ▪ SWMP in the IWWMP Ref: SO-env-929 DWA file number 27/2/2/C222/6/4					
3.3	3.3 The cooling water blowdown will be discharged into separate dams from those receiving high loads of cyanide, to prevent chemical reaction in the case of leaks.	C	The liquid water effluent from the cooling system is routed to the appropriate water effluent dams and the other sour process effluent water from the reaction sections goes to an oil-water separation tank and from there it goes to the Bio-works facility which is located at the Sasol One site. *Evidence:* ▪ Onsite communication ▪ IWWMP (Ref: SO-env-929 DWA file number 27/2/2/C222/6/4)	None	N/A	N/A	N/A	N/A

Ref	Condition	Compliance Status	Findings	Recommendations, Timeframe & Responsible Person	Measures Implemented to Address Non-Compliance	Practicality of the EMPR Commitments	Is the Non-Compliance Administrative or will it have an impact?	Historical/New Non-Compliance (Administrative measures)
			▪ Solvents SOP: Cooling tower operating overview BuOH-SCU-COOL-SOP-001					
3.4	3.4 In terms of water quality, it is considered by SRK that the currently used continuous monitoring systems are not sufficient to detect contamination of the streams entering the dams, especially by organics (such as may come from the proposed Butanol site and other Sasol operations). However, with multiple streams coming from different sources, assessment may be difficult and assigning responsibility problematical.	**NA**	This was provided for informational purposes. This condition is not auditable.	None	N/A	N/A	N/A	N/A
3.5	3.5 If there is a problem with meeting the permit discharge volume requirement, Sasol Solvents will consider various options, which may include:	**C**	All stormwater and effluent discharge are managed through the Storm Water Management Plan (SWMP) in the IWWMP. All stormwater that may be contaminated, including rainwater	None	N/A	N/A	N/A	N/A

Ref	Condition	Compliance Status	Findings	Recommendations, Timeframe & Responsible Person	Measures Implemented to Address Non-Compliance	Practicality of the EMPR Commitments	Is the Non-Compliance Administrative or will it have an impact?	Historical/New Non-Compliance (Administrative measures)
	making provision for the alternative routing of part or all of the blowdown stream to the Bioworks; negotiation of new limits with DWAF for the discharge from the North Dams; opportunities for reuse of the blowdown water within Sasol's existing operations.		falling on operational areas, is channelled to Bioworks. Evidence: ▪ Onsite communication ▪ IWWMP =Ref: SO-env-929 DWA file number 27/2/2/C222/6/4 ▪ Solvents SOP: Cooling tower operating overview BuOH-SCU-COOL-SOP-001.					
3.6	3.6 Sasol will notify DWAF of the proposed changes and will determine the need for an amendment to the permit conditions, accommodating the Butanol Complex.	C	All stormwater and effluent discharge are managed through the Storm Water Management Plan (SWMP) in the IWWMP which is submitted to DWAF for review. *Evidence:* ▪ Onsite communication ▪ IWWMP =Ref: SO-env-929 DWA file number 27/2/2/C222/6/4	None	N/A	N/A	N/A	N/A
3.7	3.7 Capacity of the stormwater system will need to be provided by Sasol to meet the demands of the Butanol Complex.	C	All stormwater and effluent discharge are managed through the Storm Water Management Plan (SWMP) in the IWWMP.	*OFI*: Stormwater drainage just outside Butanol plant can be	N/A	N/A	N/A	N/A

Ref	Condition	Compliance Status	Findings	Recommendations, Timeframe & Responsible Person	Measures Implemented to Address Non-Compliance	Practicality of the EMPR Commitments	Is the Non-Compliance Administrative or will it have an impact?	Historical/New Non-Compliance (Administrative measures)
			It was noted during the audit visit that after heavy rains (which were about 3 days prior to the audit), rainwater forms stagnant pools outside the butanol bunded area and seem to take days to drain. It did not look like overflow but perhaps a run-off drain blockage. *Evidence*: ▪ Onsite communication ▪ IWWMP =Ref: SO-env-929 DWA file number 27/2/2/C222/6/4	assessed for improved drainage during heavy rains.				
3.8	With regard to the proposed practice of diverting contaminated stormwater to the clean stormwater dams (after the first 8 – 10 mm has be captured in a sump), the water quality will be monitored after the first 3 to 4 storm events following plant commissioning. Initially monitoring will be for pH, conductivity and COD. If water quality problems are encountered, the stormwater	C	All stormwater and effluent discharge are managed through the Storm Water Management Plan (SWMP) in the IWWMP. All stormwater that may be contaminated, including rainwater falling on operational areas, is tested and channelled to Bioworks. The n-Butanol plant is operated in line with the SOP-BUT-S-C-PO-01 (this document is IP protected but was viewed onsite) Operational Procedure for Butanol Complex as well as the	None	N/A	N/A	N/A	N/A

Ref	Condition	Compliance Status	Findings	Recommendations, Timeframe & Responsible Person	Measures Implemented to Address Non-Compliance	Practicality of the EMPR Commitments	Is the Non-Compliance Administrative or will it have an impact?	Historical/New Non-Compliance (Administrative measures)
	management will be reconsidered, with provision for integration into the industrial chemical effluent sewer discharging to the Bioworks. More detailed analysis to determine what specifically is contaminating the storm water stream will also be undertaken so that, if necessary, appropriate bunding or other pollution prevention measures can be put in place.		Water Use License conditions included in the IWWMP. *Evidence*: ▪ Onsite communication ▪ SWMP in the IWWMP Ref: SO-env-929 DWA file number 27/2/2/C222/6/4					
3.9	The firefighting run off will be sampled and analysed before disposal to determine (depending on its quantity and quality) the appropriated disposal site.	C	Storm water and firewater runoff is sampled and analysed before disposal annually. No fire was recorded in the butanol plant in the last year, 2021 and therefore no sampling results and analysis are available. The procedure is available for management of firefighting run-off. *Evidence*: ▪ Onsite communication ▪ SSP-S-050_(Rev4) Fire Water Reticulation System Isolations	None	N/A	N/A	N/A	N/A

Ref	Condition	Compliance Status	Findings	Recommendations, Timeframe & Responsible Person	Measures Implemented to Address Non-Compliance	Practicality of the EMPR Commitments	Is the Non-Compliance Administrative or will it have an impact?	Historical/New Non-Compliance (Administrative measures)
3.10	During shutdown of the Butanol Complex, the flow to the E501 stripper column to be managed using tanks.	C	The n-Butanol plant is operated in line with the Operational Procedure for Butanol Complex and this is applicable during shutdown. This document is IP protected but was viewed onsite. *Evidence:* ▪ Onsite communication ▪ Butanol Plant Operating Procedure SOP-BUT-S-C-PO-01 (viewed onsite)	None	N/A	N/A	N/A	N/A
3.11	Release from process sumps to the chemical sewer after cleaning, upset conditions or shutdowns will be controlled.	C	The n-Butanol plant is operated in line with the Operational Procedure for Butanol Complex as well as the Water Use License conditions in the IWWMP. *Evidence:* ▪ Onsite communication ▪ Butanol Plant Operating Procedure SOP-BUT-S-C-PO-01 (viewed onsite)	None	N/A	N/A	N/A	N/A
3.12	The potential impact on the Bioworks during malfunctioning/shutdown will be ascertained once the volume and period of high COD discharge is	C	The n-Butanol plant, even during shutdown, is operated in line with the SOP-BUT-S-C-PO-01 (this document is IP protected but was viewed onsite) Operational Procedure for Butanol Complex	None	N/A	N/A	N/A	N/A

Ref	Condition	Compliance Status	Findings	Recommendations, Timeframe & Responsible Person	Measures Implemented to Address Non-Compliance	Practicality of the EMPR Commitments	Is the Non-Compliance Administrative or will it have an impact?	Historical/New Non-Compliance (Administrative measures)
	determined. Chloride concentrations will be monitored initially to ensure that the actual concentrations are not significantly higher than predicted values.		as well as the Water Use License conditions included in the IWWMP.					
3.13	Should a spill event occur; the effluent will be contained as far as possible. If there is a risk that the sump could overflow (such as in a storm event) then the spilled material will be stored in a tanker or other appropriate container	C	SSP-S-013 is used to record and track spill events and other environmental incidents. This Procedure ensures that incidents are tracked until they are signed-off. No spills of this nature were found. *Evidence*: ▪ SSP-S-013, Procedure for the reporting, investigating, and recording of environmental incidents (Rev 08)	None	N/A	N/A	N/A	N/A
3.14	Should the stream need to be diverted directly to the Bioworks, the flow will be diluted by at least a factor of 10 in the system prior to being passed through the Biofilters. However, as previously noted, the buffering and balancing of effluent loads at the	C	Direct diversion can only be required after heavy rain where rainwater and effluent contained in the bund is tested before redirecting towards the plant or the Bioworks. *Evidence*: ▪ Onsite communication	None	N/A	N/A	N/A	N/A

Ref	Condition	Compliance Status	Findings	Recommendations, Timeframe & Responsible Person	Measures Implemented to Address Non-Compliance	Practicality of the EMPR Commitments	Is the Non-Compliance Administrative or will it have an impact?	Historical/New Non-Compliance (Administrative measures)
	Bioworks, and specifically the opportunity for multiple recycling, provides management for the expected short-term aberrations of flow and load.							
Groundwater								
4.1	Ground water contamination can be prevented by ensuring appropriate containment strategies for surface water run-off and operational spills The current surface water management systems for this site will require upgrading to accommodate the additional volumes from the Butanol Complex	C	The n-Butanol plant is operated in line with the SSP-S-013, Procedure for the reporting, investigating, and recording of environmental incidents. Only two wells of 11 in the Midlands Site subject to WUL limits exceeded WUL limits of nitrate and fluoride. Incident register was audited, and no groundwater incidents were found. Sasolburg operations monitors groundwater quality in accordance with the WUL. Sasolburg Operations has been issued with a Water Use Licence that requires Ground water monitoring. The monitoring report was reviewed at the time of the audit. *Evidence:*	None	N/A	N/A	N/A	N/A

Ref	Condition	Compliance Status	Findings	Recommendations, Timeframe & Responsible Person	Measures Implemented to Address Non-Compliance	Practicality of the EMPR Commitments	Is the Non-Compliance Administrative or will it have an impact?	Historical/New Non-Compliance (Administrative measures)
			▪ The Groundwater Quality Monitoring Report (Ref No. SO-env-1024) February 2022 ▪ Water Use Licence (No. 14/C22K/FG/4958) that requires Ground water monitoring ▪ SSP-S-013, Procedure for the reporting, investigating, and recording of environmental incidents (Rev 08)					
4.2	The SCI East operation currently monitors the ground water quality twice a year. A number of additional monitoring boreholes around the Butanol Complex area will be included in this monitoring programme should this site be selected.	C	There are two WUL compliance monitoring wells subject to WUL limits (SRK 42D and SRK 22D) and three wells subject to remediation in the vicinity of the Butanol Complex. *Evidence*: ▪ The Groundwater Quality Monitoring Report (Ref No. SO-env-1024) February 2022.	None	N/A	N/A	N/A	N/A
4.3	Monitoring will include those chemicals from the new operation which could potentially impact on the ground water system.	C	Monitoring of boreholes/wells includes monitoring of several chemical parameters. *Evidence*:	None	N/A	N/A	N/A	N/A

Ref	Condition	Compliance Status	Findings	Recommendations, Timeframe & Responsible Person	Measures Implemented to Address Non-Compliance	Practicality of the EMPR Commitments	Is the Non-Compliance Administrative or will it have an impact?	Historical/New Non-Compliance (Administrative measures)
			▪ The Groundwater Quality Monitoring Report (Ref No. SO-env-1024) February 2022.					
Socio-economic Issues								
5.1	5.1 Direct employment opportunities for the surrounding communities	**N/A**	This condition is outside the audit period and therefore was not audited.	None	N/A	N/A	N/A	N/A
5.2	5.2 Future service-related opportunities will favour local companies and Sasol will develop a preferential employment policy for the area. This will be done in conjunction with all interested and affected groups.	**C**	Sasol has developed a Sasol Southern Africa ESD Policy which was called the Preferential Procurement Policy during the draft phase. *Evidence:* ▪ Email correspondence ▪ Sasol South Africa Enterprise and Supplier Development (ESD) Policy (Revision number 1, Revision Date: 30 June 2021)	None	N/A	N/A	N/A	N/A
5.3	A list of all contract requirements for both construction and service-related	**C**	Sasol uses the Linkage platform (https://youtu.be/SP-_wxOvxcoas) a database for SMEs. Further, the PET team has	None	N/A	N/A	N/A	N/A

Ref	Condition	Compliance Status	Findings	Recommendations, Timeframe & Responsible Person	Measures Implemented to Address Non-Compliance	Practicality of the EMPR Commitments	Is the Non-Compliance Administrative or will it have an impact?	Historical/New Non-Compliance (Administrative measures)
	opportunities during operation will be prepared and will be compared with locally available expertise, as collated by the local unemployment forums and artisans organisation. This will allow Sasol to maximise every opportunity to employ local people in project related activities and will maximise the limited socio-economic opportunities that the project presents.		a list of vendors that can be used for Projects. Relevant project teams should be able to advise which list they used. *Evidence*: ▪ Email correspondence					
5.4	Sasol will develop a preferential employment policy that recognises the company's responsibility to its surrounding socio-economic environment in the broadest possible manner. The development of this policy will be done in consultation with a wide range of community structures.	C	Sasol has developed a Sasol Southern Africa ESD Policy which was called the Preferential Procurement Policy during the draft phase. Sasol communicates with relevant business forums through the Stakeholder teams under the various regional CSI teams. *Evidence:* ▪ Email correspondence ▪ Sasol South Africa Enterprise and Supplier Development (ESD) Policy (Revision	None	N/A	N/A	N/A	N/A

Ref	Condition	Compliance Status	Findings	Recommendations, Timeframe & Responsible Person	Measures Implemented to Address Non-Compliance	Practicality of the EMPR Commitments	Is the Non-Compliance Administrative or will it have an impact?	Historical/New Non-Compliance (Administrative measures)
			number 1, Revision Date: 30 June 2021)					
5.5	This impact is difficult to mitigate as no amount of information is likely to convince people not to take a chance to travel to Sasolburg in search of employment. Sasol will develop and communicate a clear policy of preferential employment for communities adjacent to its operations. Implementation of such a policy will be rigorously pursued wherever employment opportunities arise. Clarity around this issue may act as a deterrent to outside job seekers.	C	Sasol has developed a Sasol Southern Africa ESD Policy which was called the Preferential Procurement Policy during the draft phase. *Evidence*: ▪ Email correspondence ▪ Sasol South Africa Enterprise and Supplier Development (ESD) Policy (Revision number 1, Revision Date: 30 June 2021)	None	N/A	N/A	N/A	N/A
Noise								
6.1	The plant will be designed to minimise noise generation.	N/A	This condition is outside the audit period and therefore was not audited.	None	N/A	N/A	N/A	N/A

Ref	Condition	Compliance Status	Findings	Recommendations, Timeframe & Responsible Person	Measures Implemented to Address Non-Compliance	Practicality of the EMPR Commitments	Is the Non-Compliance Administrative or will it have an impact?	Historical/New Non-Compliance (Administrative measures)
6.2	Noise generating equipment, such as compressor and turbines will be encapsulated, if necessary, to minimise noise.	C	Two compressors (KC101 and KC 301) which generate more noise are housed inside noise hood to minimise noise. *Evidence*: ▪ Onsite communication and verification ▪ Noise Survey and Impact Assessment for Hearing Conservation Purposes (Project No. SEO-090-2021-TM-N dated 20 January 2022). ▪ Environmental Noise Survey for Sasol Sasolburg, Steam Station 2, SGEPP, Sasol One, Midlands & Bunsen Area (2019) - GIJ - Report - 24539 Rev 00. Photographs of noise generating cover.	None	N/A	N/A	N/A	N/A
6.3	Sasol will comply with occupational health and safety legislation and ensure that the overall noise rating level in areas where more than one noise source is placed is less than 85 dB(A).	C	Noise surveys are conducted by Sasol to ensure compliance with Occupational Health and Safety legislation. *Evidence*: ▪ Environmental Noise Survey for Sasol Sasolburg, Steam Station 2, SGEPP, Sasol One,	None	N/A	N/A	N/A	N/A

Ref	Condition	Compliance Status	Findings	Recommendations, Timeframe & Responsible Person	Measures Implemented to Address Non-Compliance	Practicality of the EMPR Commitments	Is the Non-Compliance Administrative or will it have an impact?	Historical/New Non-Compliance (Administrative measures)
			Midlands & Bunsen Area - 23, 27 and 30 May 2019 GIJ - Report - 24539 Rev 00					
6.4	Should SCI East site be selected, monitoring of noise from the plant, especially during the evening and night, will initially be undertaken to confirm the assessments made during the Scoping Study.	C	A noise survey was conducted by GIJ in 2019. Evidence: ▪ Environmental Noise Survey for Sasol Sasolburg, Steam Station 2, SGEPP, Sasol One, Midlands & Bunsen Area - 23, 27 and 30 May 2019 GIJ - Report - 24539 Rev 00	None	N/A	N/A	N/A	N/A
6.5	SCI will respond to complaints from the community with regard to increased noise levels as a result of the Butanol Complex which may entail the installation of physical noise attenuation facilities.	C	The Sasol personnel confirmed that thre were no noise incidents recorded. *Evidence:* ▪ Incident register was provided to the auditor, but no noise incidents were reported.	None	N/A	N/A	N/A	N/A
Visual								
7.1	7.1 Sasolburg Operations will monitor complaints received regarding light pollution.	C	Sasolburg Operations has a complaints line 0169603111. All environmental incidents are uploaded on the SAP	None	N/A	N/A	N/A	N/A

Ref	Condition	Compliance Status	Findings	Recommendations, Timeframe & Responsible Person	Measures Implemented to Address Non-Compliance	Practicality of the EMPR Commitments	Is the Non-Compliance Administrative or will it have an impact?	Historical/New Non-Compliance (Administrative measures)
	Should complaints be received on a frequent basis; Sasol will consider the use of visual screening. It would be necessary to locate visual screening as close to the viewer as possible. In this regard negotiations with IAPs would be necessary in terms of location and type of visual screening.		Environmental incidents management system. This incident report and is correlated with the SAP Environmental incidents management system. The auditor was provided with the incident report for the Butanol Complex and no visual related incident was reported. *Evidence*: ▪ SSP-S-013, Procedure for the reporting, investigating, and recording of environmental incidents (Rev 08) ▪ EA External audit_incidents_FY22 FY23 – incident report					
Ecology								
8.1	The site to be concreted and investigation on flushing out yellow mongoose colony prior to construction on the site.	**N/A**	This condition is outside the audit period and therefore was not audited.	None	N/A	N/A	N/A	N/A
Safety								
9.1	Sasol will undertake a transport risk	C	Transport Risk Assessment was conducted by Sastech	None	N/A	N/A	N/A	N/A

Ref	Condition	Compliance Status	Findings	Recommendations, Timeframe & Responsible Person	Measures Implemented to Address Non-Compliance	Practicality of the EMPR Commitments	Is the Non-Compliance Administrative or will it have an impact?	Historical/New Non-Compliance (Administrative measures)
	assessment for the Butanol Project. The results of this study were not available at the time of writing this report (i.e., the EMPr) and Sasol will make the results available to the parties who requested the study DACEL and FS DEAT.		Environmental and Risk Engineering in 2001. *Evidence:* ▪ Report: Environmental Risk Assessment for N-Butanol and Iso-Butanol form Sasolburg to Durban, April 2001 compiled by Sastech Environmental and Risk Engineering (Butanol Transport and Risk Assessment – Rev 0)					
9.2	As far as the transportation of hazardous materials is concerned, Sasol will, as standard practice, ensure that its contractors adhere to the requirements of the Hazardous Substances Act (Act 15 of 1973), relevant sections of the Occupational Health and Safety Act (Act 85, of 1993) and the National Road Traffic Act (Act 93 of 1996).	C	Sasol outsources this to Chemicals Africa who appointed Barloworld to manage logistics. Adherence to these laws is ensured through training of drivers and live inspection system that checks all documentation from contractors/transporters upon entry at Sasol at all times. *Evidence*: ▪ Email communication	None	N/A	N/A	N/A	N/A
9.3	Relevant Material Safety Data Sheets will be	C	Sasol outsources this to Chemicals Africa who appointed	None	N/A	N/A	N/A	N/A

Ref	Condition	Compliance Status	Findings	Recommendations, Timeframe & Responsible Person	Measures Implemented to Address Non-Compliance	Practicality of the EMPR Commitments	Is the Non-Compliance Administrative or will it have an impact?	Historical/New Non-Compliance (Administrative measures)
	provided to contractors who will be expected to familiarise themselves with the safety requirements regarding the handling and transportation of hazardous materials.		Barloworld to manage logistics. Adherence to these laws is ensured through training of drivers and live inspection system that checks all documentation from contractors/transporters upon entry at Sasol at all times. *Evidence:* ▪ Email communication					
9.4	Sasol will maintain a Hazchem team to be on standby to deal with emergencies.	C	Sasol has Spilltech (Company) to deal with spill events for the Butanol Plant. *Evidence:* ▪ Onsite communication	None	N/A	N/A	N/A	N/A
9.5	All road tankers will be required to display the required Hazchem codes.	C	Barloworld contracted by Chemicals Africa manages logistics of product transport for Sasol. The site has dedicated inspectors to ensure driver and vehicle compliance. No vehicle or driver is allowed to enter the site without a renaissance bar code. *Evidence:* ▪ Email communication	None	N/A	N/A	N/A	N/A

Ref	Condition	Compliance Status	Findings	Recommendations, Timeframe & Responsible Person	Measures Implemented to Address Non-Compliance	Practicality of the EMPR Commitments	Is the Non-Compliance Administrative or will it have an impact?	Historical/New Non-Compliance (Administrative measures)
9.6	Sasol will ensure that all relevant emergency information is communicated to local authorities along the proposed transport routes.	C	Barloworld contracted by Chemicals Africa manages logistics of product transport for Sasol. *Evidence:* ▪ Email communication	None	N/A	N/A	N/A	N/A
9.7	Professionally trained emergency personnel will be available on site to respond to emergencies within the shortest possible times.	C	Sasol has planned actions to prevent or mitigate adverse environmental impacts from emergency situations. In addition, staff were appointed and trained to manage all risks and emergencies that could occur on site. *Evidence:* ▪ Audit report_352348_ISO 45001_2018_ISO 14001_2015 ISO 9001_2015 Recertification Audit	None	N/A	N/A	N/A	N/A
Solid and Other Waste								
10.1.1	All domestic and non-hazardous materials will be disposed of at a permitted general waste site.	C	Sasolburg Operations have the waste management procedure which is adhered to. Competent service providers were appointed to remove the waste from site. Safe disposal certificates are kept	None	N/A		N/A	N/A

Ref	Condition	Compliance Status	Findings	Recommendations, Timeframe & Responsible Person	Measures Implemented to Address Non-Compliance	Practicality of the EMPR Commitments	Is the Non-Compliance Administrative or will it have an impact?	Historical/New Non-Compliance (Administrative measures)
			onsite. Waste registers for Butanol was also shared with the auditor. *Evidence:* ▪ SSP-S-014 (5) - Procedure for the management of waste on the Sasolburg Operations_ Sites ▪ Waste Register SuPM FY22 and FY23 (2021-2022)					
10.1.2	A contractor will collect paper, glass, plastic and cans for recycling.	C	Waste separation and recycling activities are conducted on site. Sasolburg Operations have the waste management procedure which is adhered to. *Evidence:* ▪ SSP-S-014 (5) - Procedure for the management of waste on the Sasolburg Operations_ Sites	None	N/A	N/A	N/A	N/A
10.2.1	Spent catalysts will either be disposed of by a specialist waste contractor at a licensed hazardous waste site or, if possible, returned to the supplier.	C	Spent catalyst is only disposed of during shutdowns by a registered service provider (Enviroserv Pty Ltd in the 2018 shutdown) to a registered hazardous waste site (Holfontein). Safe disposal certificates are kept as proof.	None	N/A	N/A	N/A	N/A

Ref	Condition	Compliance Status	Findings	Recommendations, Timeframe & Responsible Person	Measures Implemented to Address Non-Compliance	Practicality of the EMPR Commitments	Is the Non-Compliance Administrative or will it have an impact?	Historical/New Non-Compliance (Administrative measures)
			The next planned shutdown is in 2023. *Evidence:* ▪ Onsite communication ▪ SSP-S-014 (5) - Procedure for the management of waste on the Sasolburg Operations_ Sites ▪ Safe Disposal Certificate – Manifest # 0002268118 (EnviroServ) ▪ Waste Register SuPM FY22 and FY23 (2021-2022)					
10.2.2	Guard-beds may be replaced during Shutdown years and must be disposed of by a specialist waste contractor at a licensed waste site	C	Guard-beds is only disposed of during shutdowns by a registered service provider (Enviroserv (Pty) Ltd in the 2018 shutdown) to a registered hazardous waste site (Holfontein). Safe disposal certificates are kept as proof. A waste management procedure (SSP-S014) is also adhered to for this operation. Waste register for n-Butanol was shared with the auditor but no disposal certificate for guard-beds. The last shutdown was in 2018 and the next planned shutdown is in 2023.	None	N/A	N/A	N/A	N/A

Ref	Condition	Compliance Status	Findings	Recommendations, Timeframe & Responsible Person	Measures Implemented to Address Non-Compliance	Practicality of the EMPR Commitments	Is the Non-Compliance Administrative or will it have an impact?	Historical/New Non-Compliance (Administrative measures)
			Evidence: ▪ Onsite communication ▪ SSP-S-014 (5) - Procedure for the management of waste on the Sasolburg Operations_ Sites ▪ Midlands Operations (MO) Waste Register (21 August 2019)					
10.2.3	The solid materials from the horizontal flare knock out drum will be disposed of by a specialist waste contractor at a licensed hazardous waste disposal site. The knockout drum will be emptied during shutdowns	C	The horizontal flare knock out drum is emptied during shutdown (next shut down date 2023). Sasol Sasolburg operations have the waste management procedure (SSP-S-014) that is adhered to. Competent service providers were appointed to remove the waste from site. Safe disposal certificates are kept onsite. *Evidence:* ▪ Onsite communication ▪ SSP-S-014 (5) - Procedure for the management of waste on the Sasolburg Operations_ Sites ▪ Safe Disposal Certificate – Manifest # 0002258374 dated 26/09/2018 (Enviroserv)	None	N/A	N/A	N/A	N/A

Ref	Condition	Compliance Status	Findings	Recommendations, Timeframe & Responsible Person	Measures Implemented to Address Non-Compliance	Practicality of the EMPR Commitments	Is the Non-Compliance Administrative or will it have an impact?	Historical/New Non-Compliance (Administrative measures)
10.3	Management of cooling tower sludge from the cooling tower plates and precipitation of salts will be undertaken in association with the overall Sasolburg and operations wastewater site management.	C	Cooling tower sludge consist mainly of soil/sand. The sludge (soil) collects in the cooling towers sumps. The floors on the cooling tower sumps are flushed with water and water is handled through plant wastewater management. Sludge (soil) is removed during shutdowns, and this is non-contaminated. *Evidence:* ▪ -Onsite communication ▪ -IWWMP (WC/DM) Ref: SO-env-929 DWA file number 27/2/2/C222/6/4 ▪ -Solvents SOP: Cooling tower operating overview BuOH-SCU-COOL-SOP-001	None	N/A	N/A	N/A	N/A
10.4.1	Sufficient storage capacity will be made available for storage of the fuel oils.	C	There is sufficient storage and systems in place for adequate storage of fuel oils; inputs, product, spills, waste effluent. The fuel oil tank has a volume of 386 m3. The volume of the tank during operation is 292 m3. Therefore, a spare volume of 64m3 is available. TK 824 tank has enough capacity to hold the BFO.	None	N/A	N/A	N/A	N/A

Ref	Condition	Compliance Status	Findings	Recommendations, Timeframe & Responsible Person	Measures Implemented to Address Non-Compliance	Practicality of the EMPR Commitments	Is the Non-Compliance Administrative or will it have an impact?	Historical/New Non-Compliance (Administrative measures)
			Evidence: ▪ Onsite communication ▪ Fuel Oil COA – Butanol Fuel Oil Specification (sampling point EX TK 824, Sampled ID: 10505836)					
10.4.2	Contingencies will be put into place for handling of spillages of the fuel oils due to leaks in pipes or tanks.	C	Weekly and monthly inspections are conducted on equipment with specific focus on the mechanical seal. Inspections is done for: any leaks on flanges, casing, fittings and mechanical seals, oil levels and leakages on equipment. All tanks are placed within a bund to contain any leaks that could occur. *Evidence*: ▪ Onsite communication ▪ SSP-EM-013 Procedure for ensuring mechanical seal integrity – to prevent, manage and handle spillages.	None	N/A	N/A	N/A	N/A
10.4.3	Tanks will be bunded and runoff will be appropriately diverted.	C	The area with process chemicals is properly bunded and the surrounding area is well-paved and sloped to ensure process chemicals are channelled to sumps. The bund capacity is	None	N/A	N/A	N/A	N/A

Ref	Condition	Compliance Status	Findings	Recommendations, Timeframe & Responsible Person	Measures Implemented to Address Non-Compliance	Practicality of the EMPR Commitments	Is the Non-Compliance Administrative or will it have an impact?	Historical/New Non-Compliance (Administrative measures)
			110% of the largest tank in the bund. Bund wall calculation was provided for audit purposes. *Evidence:* ▪ Onsite verification and communication ▪ Stormwater Management Plan compiled in 'IWWMP' report is used to manage this area					
Mistrust								
11	SCI will communicate the conditions of authorisation for the Butanol Project to affected communities.	C	As no proof was retained that the conditions of the Authorisation were communicated at the time, the conditions will again be made available through the public participation process that will be followed when this External Audit report is posted on the public accessible web site. *Evidence:* ▪ Environmental Authorisation External Audit letter to the DESTEA dated 29 November 2019 requesting corrective action to address the finding in the 2019 EA and EMPr external compliance audit (Sasol Operations document reference: SO-env-620).	None	N/A	N/A	N/A	N/A

Ref	Condition	Compliance Status	Findings	Recommendations, Timeframe & Responsible Person	Measures Implemented to Address Non-Compliance	Practicality of the EMPR Commitments	Is the Non-Compliance Administrative or will it have an impact?	Historical/New Non-Compliance (Administrative measures)
			▪ DESTEA response letter to Sasol Operations dated 01 February 2021 granting approval to the request made and corrective action suggested by Sasol (DESTEA document reference: RE Exemption Application: SO-env-620: Butanol Complex)					

5 PROGRESS AGAINST PREVIOUS AUDIT FINDINGS

The previous compliance audit report against the consolidated EA and EMPr was compiled by the Northwest University CEM in 2019. A comparison in the change of compliance rating from the 2018 and 2023 audits are provided in **Figure 5-1** and **Table 5-1** below, and provides a summary of the audit findings for the previous and current audits (2018 and 2023). The 2023 audit identified one non-compliant condition.

Figure 5-1 - Comparison of conditions compliance levels for 2019 and 2022

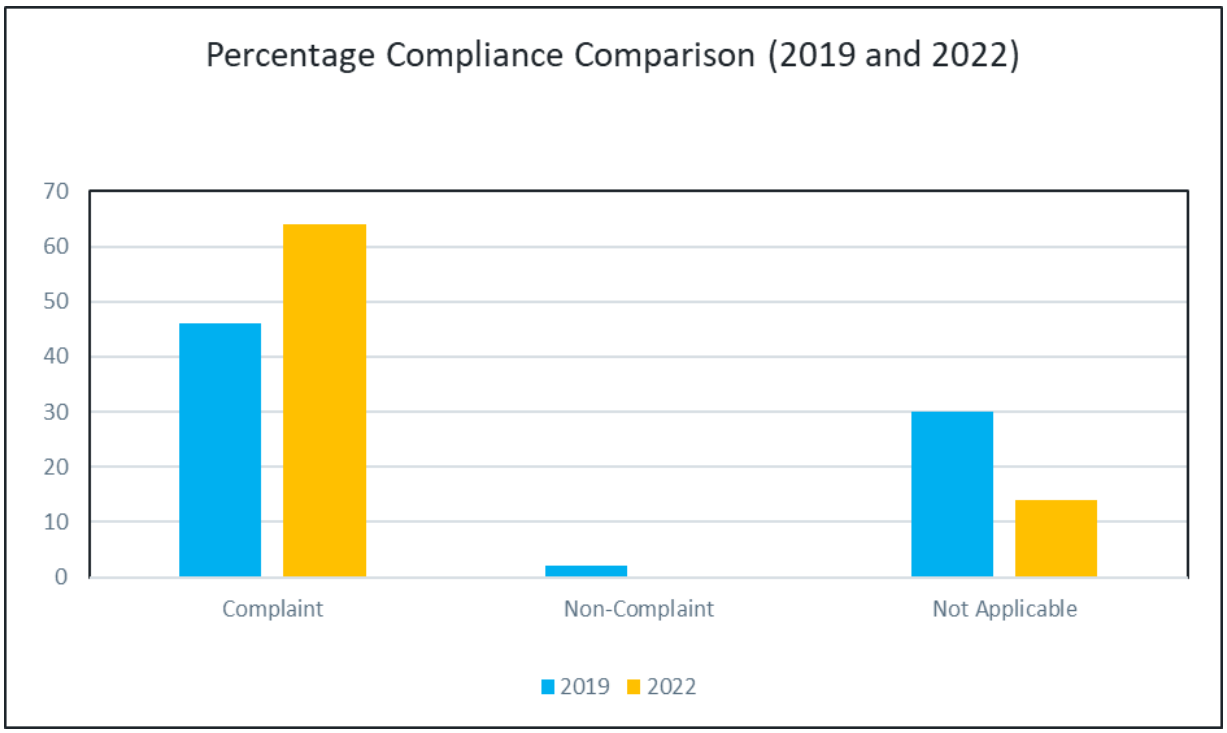

Table 5-1 - Progress against Previous Audit Findings – EA Specific Conditions

Ref	Commitment	2019 Status	2019 Finding	2022 Status	2022 Finding
EMPr Conditions					
11	SCI will communicate the conditions of authorisation for the Butanol Project to affected communities.	NC	FNJM02: At the time of the audit no evidence could be produced that the conditions of the RoD for the Butanol plant have been communicated to the affected communities. See communique	C	As no proof was retained that the conditions of the Authorisation were communicated at the time, the conditions will again be made available through the public participation process that will be followed when this External Audit report is posted on the public accessible web site.

Ref	Commitment	2019 Status	2019 Finding	2022 Status	2022 Finding
			Draft internal environmental audit report for Butanol facility dated 24 May 2019.		

6 SUMMARY OF THE AUDIT FINDINGS

6.1 SUMMARY OF EA FINDINGS

The audit findings have been summarised into the following categories: compliance, non-compliance and not applicable. The overall audit findings concerning compliance to the EA conditions are as listed in **Table 6-1** below.

Table 6-1 - Summary of EA Compliance Audit Findings

Section of the EA	No. Commitments	C	NC	N/A
Location	1	0	0	1
Applicant	1	0	0	1
Special Conditions	20	15	0	5
Standard Conditions	2	1	0	1
Key factors in the Decision	7	1	0	6
Duration and Date of Expiry	2	1	0	1
Appeal	1	0	0	1
Total	34	18	0	16
Total Percentage		53%	0	47%
Percentage Compliance with Applicable Conditions	100%			

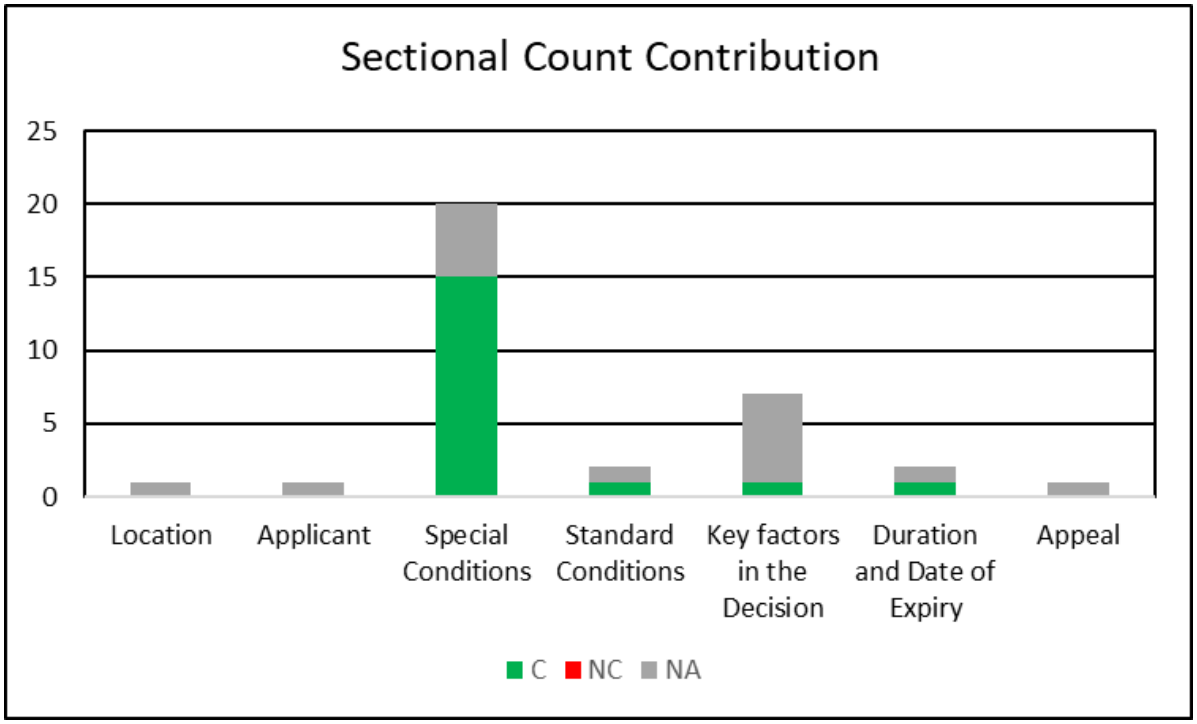

Figure 6-1 - Sectional number/count contribution for the EA conditions per Section

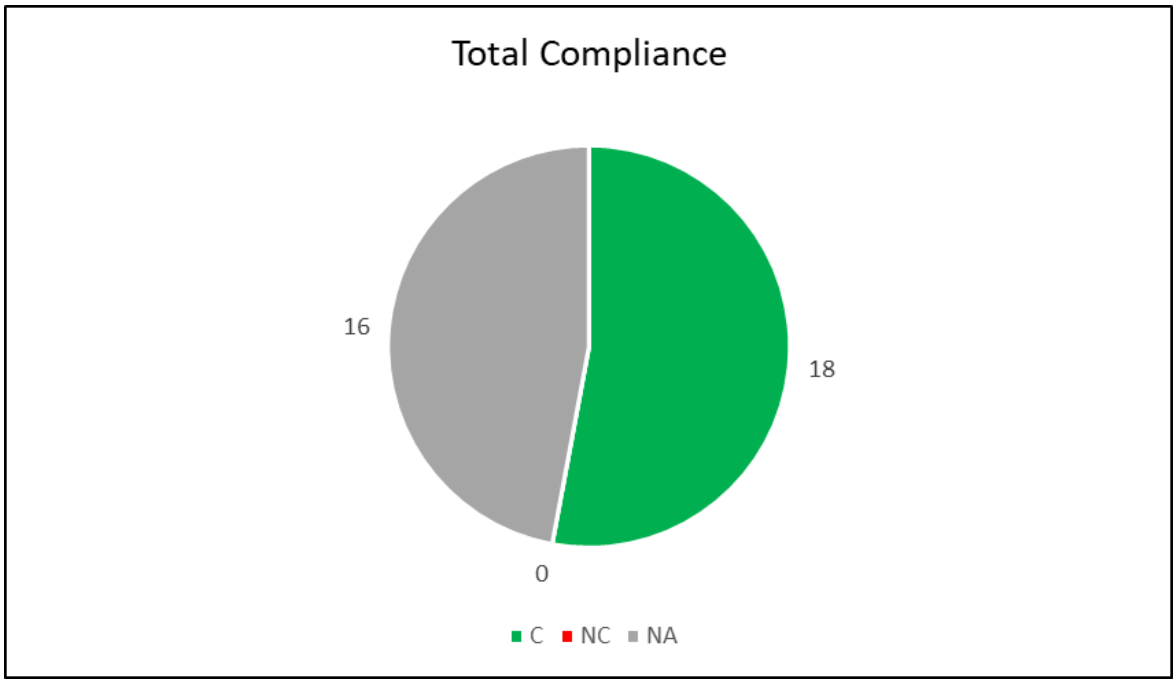

Figure 6-2 - Overall compliance percentage of the EA conditions

Figure 6-3 illustrates the percentage contribution of the findings of the EA commitments and **Figure 6-4** presents the total percentage compliance for the facility.

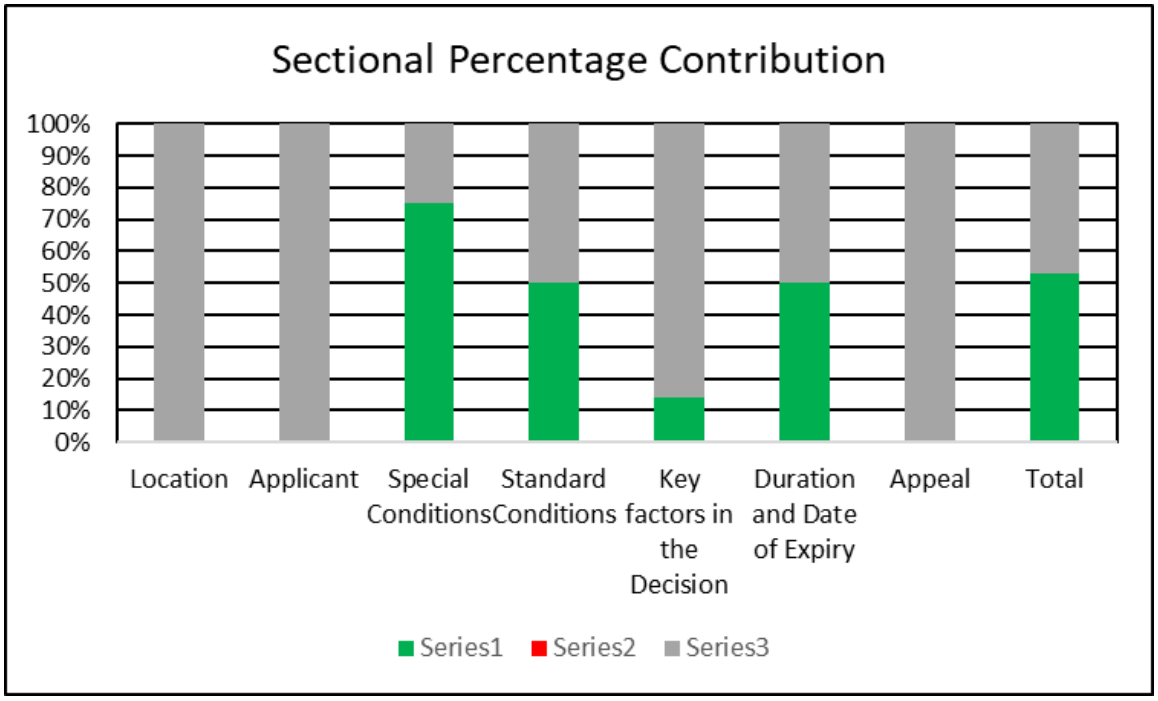

Figure 6-3 - Percentage contribution of findings made to the EA Commitments per Section

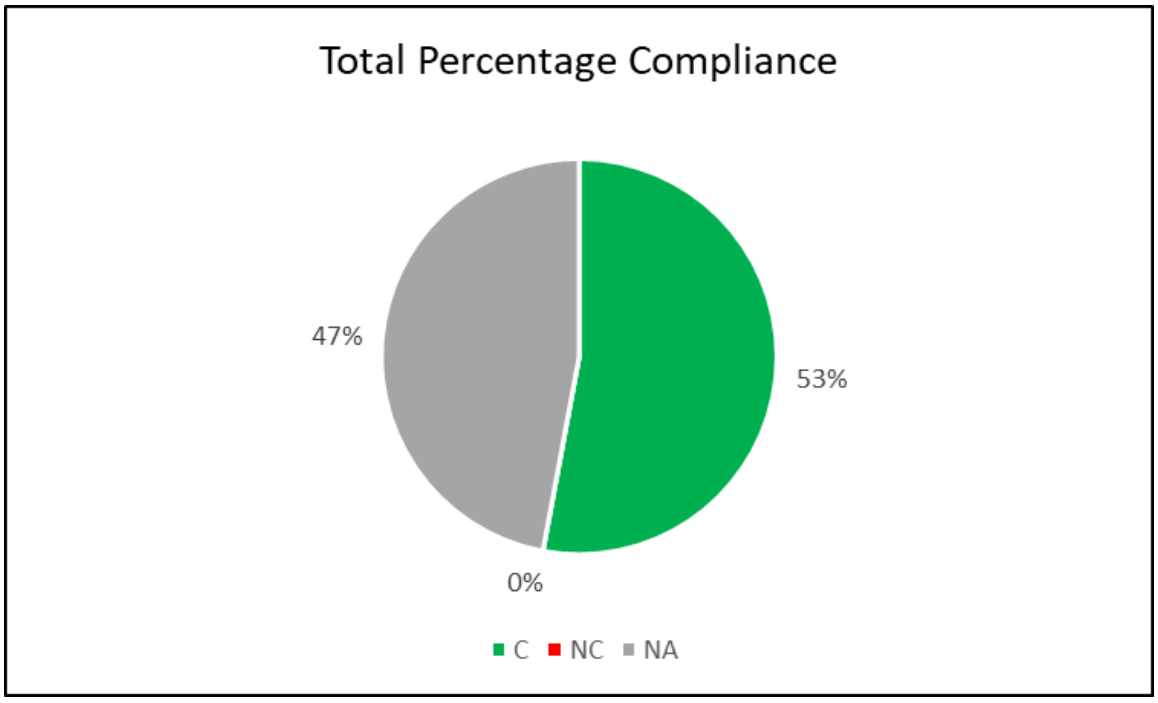

Figure 6-4 - Overall percentage findings on compliance to the EA Commitments

6.2 SUMMARY OF EMPR FINDINGS

Table 6-2 summarizes the EMPR compliance audit findings per section and this is graphically presented in **Figure 6-1 and Figure 6-2.** The two non-compliances in the 2019 audit have been closed out. The EMPR findings are therefore 100% compliant.

Table 6-2 - Summary of EMPR Compliance Audit Findings

Section of the EMPr	No. Commitments	C	NC	N/A
Air Quality	4	4	0	0
Surface Water	14	13	0	1
Ground Water	3	3	0	0
Socio-economic aspects	5	4	0	1
Noise	5	4	0	1
Visual aspects	1	1	0	0
Ecological aspects	1	0	0	1
Safety	7	7	0	0
Solid and Other Waste	9	9	0	0
Mistrust	1	1	0	0
Total	51	45	0	4
Total Percentage		92%	0	8%
Percentage Compliance with Applicable Conditions	100%			

Figure 6-6 illustrates the number/count contribution of the findings of the EMPr per section while **Figure 6-5** presents the total proportion of compliance for the facility.

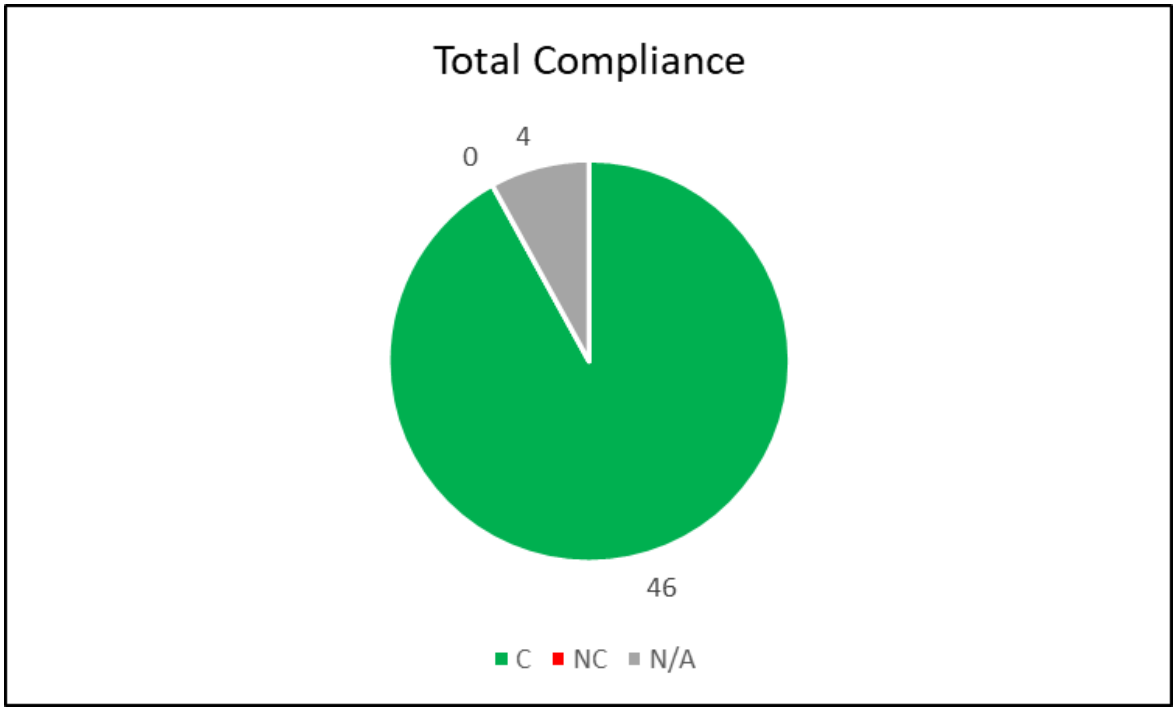

Figure 6-5 - Overall count findings on compliance to the EMPr Commitments

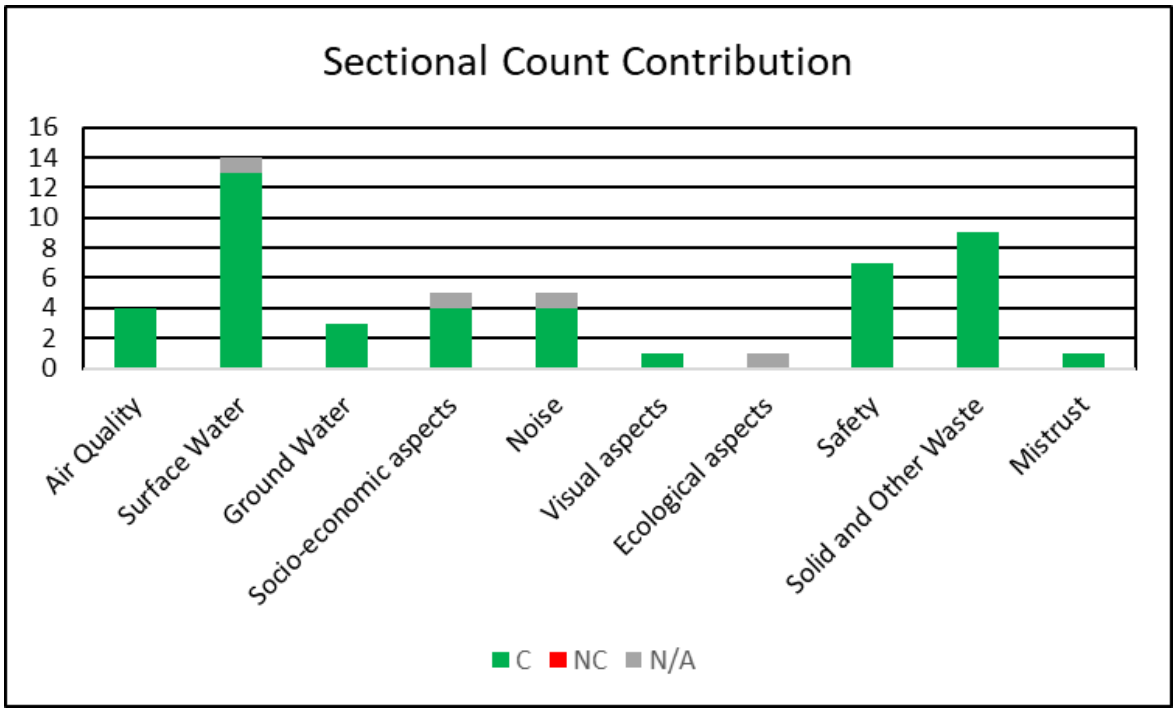

Figure 6-6 - Number/Count contribution of findings made to the EMPr Commitments per Section

Figure 6-7 presents the total percentage compliance for the facility and **Figure 6-8** illustrates the percentage contribution of the findings of the EMPr commitments.

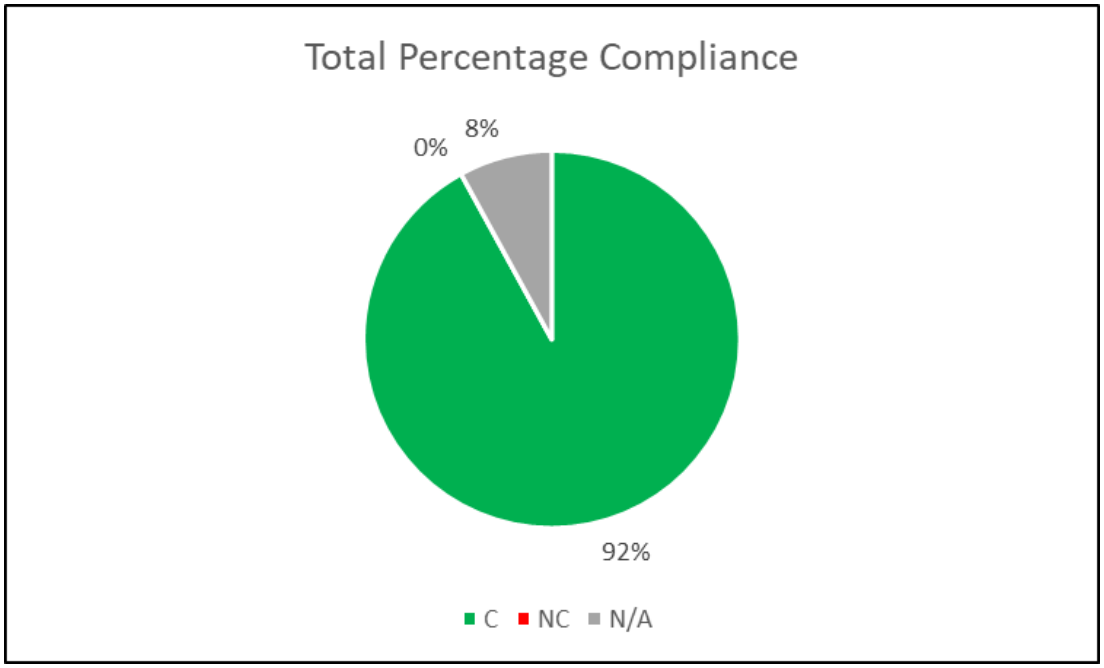

Figure 6-7 - Overall percentage findings on compliance to the EMPr Commitments

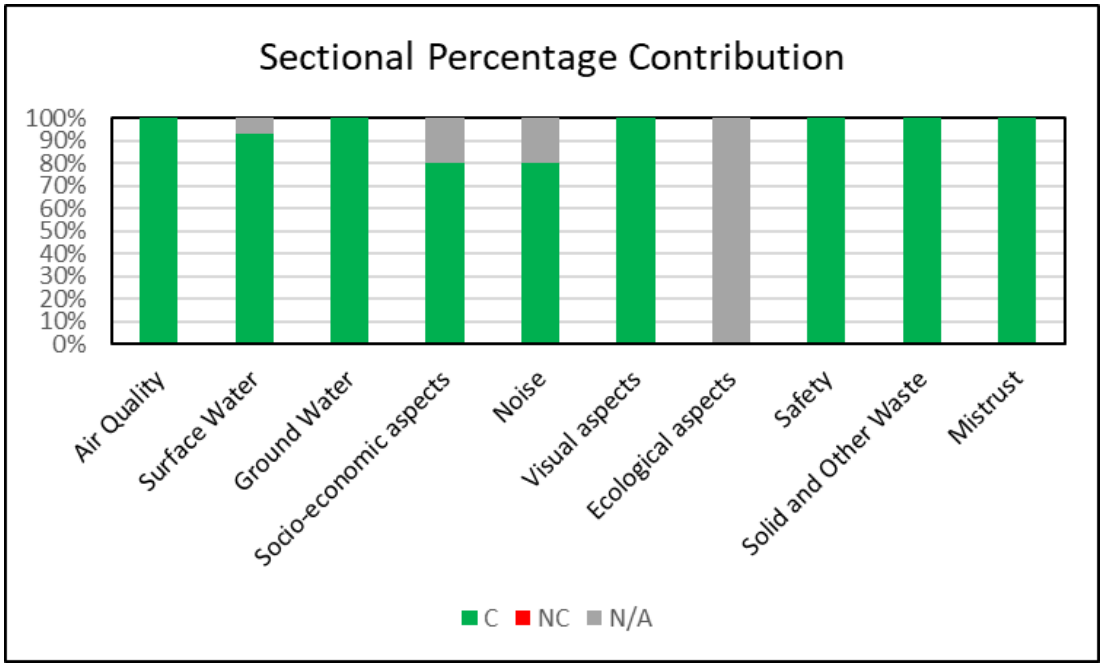

Figure 6-8 - Percentage contribution of findings made to the EMPr Commitments per Section

7 RECOMMENDATIONS

It is recommended that all conditions listed in the RoD (as amended) should be addressed in the audit regardless of the department in which they are administered within Sasol. For instance, in the 2019 audit, transport of hazardous material was not assessed as this condition was regarded as: 'Not relevant to operational phase'. However, a transport related incident was recorded in July 2022 where a tanker top lid was not sealed properly, and a spill resulted. The spill is an environmental impact related to transport and therefore relevant for operations and for auditing.

The 2019 audit for the Butanol plant recommended that amendments to the EMPr be submitted for authorisation in order to align with the amended EA conditions. This 2022 audit recommends follow through with the submission of the application form for EMPr amendments to the Free State DESTEA.

As mentioned above, it is understood that Sasol has many departments that handle specific documentation such as safety which is handled by the Sasol's occupational health and safety department. However, on the overall it seems there is an ineffective document control system. The following inefficiencies can be addressed for auditing purposes:

- Improvement on closing out complaints and incidents;
- Missing records for waste management such as waste disposal certificates;
- Dating of documents such as waste registers and incidents reports; and
- File naming to be consistent for ease of reference. SOPs are consistent in their file-naming and similar filing system can be implemented for other documents.

8 CONCLUSION

Regulation 34 and Appendix 7 of the EIA Regulations 2014 (as amended) requires an assessment of the adequacy and effectiveness of the EA and EMPr as part of the audit scope, as follows:

- Assess the level of compliance with the conditions of the EA.

The EA compliance audit has identified that the majority of the EA commitments remain applicable, and the EA is considered effective. As such, WSP does not recommend any amendment of the EA as it is sufficient in managing environmental impacts. The initial EA (RoD) was issued on 26 March 2001 to govern some of the construction phase as well as the operational phase impacts.

- Assess the level of compliance with the conditions of the EMPr and the ability of the EMPr to mitigate identified environmental impacts during the operational phase.

The EMPr compliance audit has identified that the majority of the EMPr commitments applicable to the operational phase of the activity (the operation of the Butanol Plant) remain applicable. However, similar to the EA conditions, several conditions in the EMPr were applicable to the construction phase only and not to the operation phase. Where required, conditions detailed as relevant to the construction phase only in the EMPr should be made applicable to the operational phase and activities of the Butanol Complex. In addition, and where applicable, mitigation measures in the EMPr should be amended based on the new processes implemented by Sasol to manage the environmental impacts. The EMPr is effective to manage the environmental impacts at the Butanol Complex, however, it is recommended that these documented amendments are made to the EMPr.

WSP do acknowledge that Sasol has systems in place which are more robust for monitoring compliance and implementing changes than through the EA audit. This includes implementation of the ISO 14001 standards and the annual audit of each business unit to meet these standards. In addition, the ISO 14001 standards promotes continuous improvement. The recommendations and amendments to the mitigation measures of the EMPr can be implemented through this standard as well.

During site verification it was observed that Sasol is making effort to ensure environmental compliance. The surroundings are kept clean both in the plant and general areas, signage indoors and outdoors is clear and unobstructed, personnel onsite comply with site rules and PPE is worn in appropriate areas.

New impacts and risks are continually identified and assessed by Sasol's Environmental Department, which assesses environmental risks and drives improvement implementation. This Department facilitates Environmental Risk Assessments per business entity to ensure that gaps are addressed through implementation of mitigation measures via the Integrated Management System.

In conclusion, WSP considers that Sasol continues to operate each business and process unit under an Environmental Management System to meet its licence compliance conditions (EA, AEL, EMPr, WUL, etc). This is effective due to mitigation gaps in the EMPr and can be used to regularly identify new impacts and risks.

9 DECLARATIONS

INDEPENDENT AUDITOR DECLARATION

Appendix 7 of GNR 982 refers to the need for the independent auditor to declare his/her independence of the holder of the EA.

NAME OF INDEPENDENT AUDITOR: Takadzani Takalani

UNDERTAKING

I, Takadzani Takalani, the undersigned and duly authorized thereto, by WSP, have studied Sasol South Africa Butanol Plant Operations and compared the operations to the EA and approved EMPR and compiled this report to the best of my knowledge. This section should be read with section 2.

Signed at Cape Town on this the 06 June 2023

SIGNATURE OF INDEPENDENT AUDITOR

SIGNED IN LINE WITH THE REQUIREMENTS OF NEMA, GNR 982, APPENDIX 7, AS PUBLISHED UNDER THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NO. 107 OF 1998), AS AMENDED.

Appendix A

AUDIT TEAM CV

Ian Malloy

Earth and Environment, Environmental Planning & Advisory, Senior Consultant

CAREER SUMMARY

Ian has ten years of working experience as an Environmental Consultant focussing on environmental management and auditing, waste planning, and environmental engineering. His key career and academic development are in the field of environmental management and engineering with a focus on waste, wastewater and water. The projects completed include Water Use Licence (WUL) and Waste Management Licence (WML) Applications, Environmental Impact Assessments (EIAs), Basic Assessments (BAs) and developing Environmental Management Programmes (EMPrs), developing IWMPs for District and Local Municipalities, WMPs for industry, conducting environmental compliance audits and GRAP 17 and 19 assessments of landfill sites.

<1 year with WSP

9 years of experience

Area of expertise

Waste Management and Planning

Environmental Management

Waste Management Licencing (WML)

Water Use Licencing (WUL)

Basic Assessment (BA)

Environmental Impact Assessment (EIA)

Development of Environmental Management Programmes (EMPr)

Compliance Auditing (EA, EMPr, WML, WUL)

Development of municipal Integrated Waste Management Plans (IWMPs)

Environmental Engineering (Wastewater Treatment and Waste Management)

GRAP 17 and 19 Assessments of Landfill Sites

Surface and Groundwater Monitoring

Language

English and Afrikaans

EDUCATION

Master of Water Engineering, University of Cape Town	2020 – 2023 (in progress)
Bachelor of Engineering (Honours), Environmental Engineering, University of Pretoria	2019
Bachelor of Chemical Engineering, Stellenbosch University	2016

ADDITIONAL TRAINING

Ian Malloy

Earth and Environment, Environmental Planning & Advisory, Senior Consultant

ISO 9001:2015 SAATCA registered lead auditor training course (Quality Management Systems) 2015

PROFESSIONAL MEMBERSHIPS

Registered as a Candidate Engineer: Engineering Council of South Africa (ECSA), Registration No: 2021204206 2020

Member of the Institute of Waste Management Southern Africa (IWMSA), Registration No: 30120185, Western Cape Branch Committee Member 2020

PROFESSIONAL HISTORY

WSP Group Africa (Pty) Ltd	November 2022 - present
GIBB Environmental (Pty) Ltd	2019 – 2022
GIBB (Pty) Ltd	2013 – 2019

PROFESSIONAL EXPERIENCE

Waste Management and Planning

District and Municipal Integrated Waste Management Plans and Waste Minimisation Plans

Garden Route District Municipality, Garden Route District Municipality Waste Minimisation Strategy, South Africa
2020 to 2021
Environmental and Waste Consultant
Develop waste minimisation strategies for the Garden Route District Municipality and the seven local municipalities.

Midvaal Local Municipality, Midvaal Local Municipality Integrated Waste Management Plan Review, South Africa
2020 to 2021
Environmental and Waste Consultant
Revision of the Midvaal Local Municipality Integrated Waste Management Plan (IWMP).

Vuthela iLembe LED Programme, Ilembe District Municipality IWMP, South Africa
2018 to 2020
Environmental and Waste Consultant
Development of the iLembe District IWMP and the revision of the KwaDukuza and Mandeni Local Municipality IWMPs.

Scoping Assessment for a regional landfill site for the iLembe District Municipality.

Ingquza Hill Local Municipality, Ingquza Hill Local Municipality IWMP, South Africa
2020 to 2021
Environmental and Waste Consultant
Development of the Ingquza Hill Local Municipality IWMP

Elundi Local Municipality, Elundi Local Municipality IWMP, South Africa
2015 to 2016
Junior Environmental and Waste Consultant
Development of the Elundini Local Municipality IWMP

Dr Ruth S Mompati District Municipality, Dr Ruth S Mompati District Municipality IMWP, South Africa
2015 to 2016

Ian Malloy

Earth and Environment, Environmental Planning & Advisory, Senior Consultant

Junior Environmental and Waste Consultant
Development of the Dr Ruth S Mompati District Municipality and the five Local Municipality IWMPs (Naledi, Mamusa, Greater Taung, Lewkwa-Teemane and Kagisano Molopo Local Municipalities)

Development Bank of South Africa, DBSA Material Recovery Facility Feasibility Assessment, South Africa
2020 to 2021
Environmental and Waste Consultant
Feasibility assessment for the development of small material recovery facilities across four Provinces (Eastern Cape, Northern Cape, Limpopo and Mpumalanga)

ECDC Hazardous Waste Facility Feasibility Study Phase 2, South Africa
2017
Environmental and Waste Consultant
Hazardous waste survey, feasibility study and cost analysis for the development of a hazardous waste facility in the Eastern Cape, south Africa

Landfill GRAP 17 and 19 Assessments

Kannaland Local Municipality, Kannaland Local Municipality GRAP 17 And 19 Assessments, South Africa
2019 to 2019
Environmental and Waste Consultant
GRAP 17 and GRAP 19 assessments of 4 landfill sites in municipality (Ladismith, Calitzdorp, Zoar and Van Wyksdorp Landfill Sites).

Nyandeni Local Municipality, Nyandeni Local Municipality GRAP 17 And 19 Assessments, South Africa
2019 to 2019
Environmental and Waste Consultant
GRAP 17 and GRAP 19 assessments of 1 landfill site and 1 transfer station in municipality.

Environmental Impact Assessment and Basic Assessment Process

Stellenbosch Local Municipality, Devon Valley Landfill Site (New Cell 4), South Africa
2021 to 2022
Environmental Consultant
Basic Assessment Process for the amendment of the Waste Management Licence for the development of a new cell at the Devon Valley Landfill Site in Stellenbosch, Western Cape, South Africa

Department of Forestry, Fisheries and Environment, Waste Management Licence Applications for Five Unlicenced Waste Disposal Facilities, North West, Mpumalanga and Eastern Cape, South Africa
2021 to 2022
Environmental Consultant
Environmental Impact Assessment and Basic Assessment Processes for the licencing of five (5) unlicenced Waste Disposal Facilities in the North West, Mpumalanga and Eastern Cape provinces, South Africa**.** Four (4) applications for operation Waste Management Licences (WMLs) and one (1) application for an operation to decommissioning WML.

Centurion Aerospace Village (CAV), CAV Sewer Pipeline, , South Africa
2021 to 2022
Environmental Consultant
Basic Assessment for the installation of a sewer pipeline to be connected to the existing municipality sewer services network, Centurion, City of Tshwane Metropolitan Municipality, Gauteng, South Africa.

Environmental Compliance Audits

Orion Engineered Carbons (Pty) Ltd, NUP and EMPr Audit for the storage of CBO in tanks at the Dom Pedro Facility at the Port of Port Elizabeth, South Africa

Ian Malloy

Earth and Environment, Environmental Planning & Advisory, Senior Consultant

2022 - 2023
Environmental Auditor
External compliance audit of the NUP (Noxious Use Permit) and EMPr for the storage of carbon black oil (CBO) in tanks at the Dom Pedro facility at the Port of Port Elizabeth.

Dekro Paints (Pty) Ltd, Dekro WML External Compliance Audit, Cape Town, South Africa
2023 to 2023
Environmental Auditor
External compliance audit of the waste management licence for the solvent recovery facility at the Dekro Paints facility in Kuilsriver, Cape Town.

Sasol Pipeline Operations, Sasol SNI and GNP Pipeline Audits, South Africa
2022 to 2022
Environmental Auditor
External compliance audit of the SNI and GNP pipeline against the EA, EMPr and WUL conditions

Sasol South Africa Limited, Sasol Sasolburg EA Audits, South Africa
2022 to 2022
Environmental Auditor
External compliance audit of nine unit operations against their EA and EMPr conditions at the Sasol One Complex in Sasolburg.

Langeberg Local Municipality, Langeberg Local Municipality Landfill External Audits, South Africa
2019 to 2022
Environmental Auditor
External annual audits of 3 landfill sites (Ashton, Bonnievale and Montagu) according to their waste management licence conditions

Kannaland Local Municipality, Kannaland Local Municipality Landfill External Audits, South Africa
2019 to 2019
Environmental Auditor
External audit of 4 landfill sites in the municipality according to waste management licence conditions

Environmental Management Plans and Environmental Control Officer

Orion Engineered Carbons (Pty) Ltd, Operational Environmental Management Programme (OEMPr) for the OEC Tanks Farms at Latita Tank Farm, Zone 7, Coega SEZ, Port of Ngqura, South Africa
2022 - 2023
Project Manager
Develop the OEMPr for the development of the OEC Tank Farm within the Latita Tank Farm in Zone 7, Coega SEZ, Port of Ngqura, Gqeberha, South Africa.

Eskom, Eskom Hotazel-Mothibistad 132 kV Power Line Installation with Associated Substations, South Africa
2017 to 2019
External Environmental Control Office
Monthly ECO audits for the construction of 132 kV power lines and substations in Hotazel and Kuruman in the Northern Cape.

Mott MacDonald, R61 Road Upgrade from Majola Tea to Tombo, South Africa
2015 to 2019
External Environmental Control Officer
Monthly ECO audits for the road upgrade and construction of the R61 road from Majola Tea to Tombo, Eastern Cape.

OR Tambo District Municipality and Amatole Water, King Sabata Dalinyebo Local Municipality Presidential Intervention Bulk Water Supply Infrastructure Upgrade Project title, South Africa

Ian Malloy

Earth and Environment, Environmental Planning & Advisory, Senior Consultant

2013 to 2019
External Environmental Control Officer
Coordinate all environmental management and auditing of all related bulk water supply projects. Undertake monthly ECO audits for the upgrade of the bulk water infrastructure within the King Sabata Dalinyebo Local Municipality. Projects included the construction of numerous reservoirs and installation of pipelines within the municipal area.

Eskom, Eskom Hombe and Taweni Substation with Associated 132 kV Power Lines, South Africa
2013 to 2016
External Environmental Control Officer
Monthly ECO audits for the construction of two 132 kV power lines and the Hombe and Taweni substations in the Eastern Cape.

Eskom, ESKOM GREATER MTHATHA POWER LINE, South Africa
2013 to 2014
External Environmental Control Officer
Monthly ECO audits for the construction of a 132 kV power line in Mthatha, Eastern Cape.

PD Naidoo & Associates, R61 Road Upgrade in Engcobo, South Africa
2013 to 2016
External Environmental Control Officer
Monthly ECO audits for the road upgrade and construction of the R61 road in Engcobo, Eastern Cape.

Dissertations and Research Projects

Department of Civil Engineering, University of Cape Town, Master of Engineering Dissertation.

2023

Utilisation of the Biomath protocol for calibration of a model based on biological sulfate reduction (BSR) for the treatment of coal mine drainage and Fischer-Tropsch Reaction Water. Conduct a global sensitivity analysis (GSA) and uncertainty analysis to calibrate the model, determine the most sensitive parameters in the prototype CSTR-BSR model developed by Dr. T. Harding and reduce the uncertainty of the results during the simulations (with the use of DHI West®).

Department of Chemical Engineering, Stellenbosch University, Bachelor of Engineering, Research Project

2016

Conduct laboratory experiments to investigate the factors that influence elution of gold from and adsorption of gold onto activated carbon. This was done to determine if gold can be transferred from fine to coarse activated carbon in solution during or after the carbon adsorption process to extract gold stored on fine activated carbon.

Takadzani Takalani

Environmental Planning and Advisory, Senior Consultant

CAREER SUMMARY

Takadzani Takalani graduated from the University of Cape Town with a BSc in Environmental and Geographical Science in 2005 and completed her MSc in the same field in 2012. Takadzani is a Senior Consultant in the Environmental Planning and Advisory Division of WSP based in the Cape Town office. She has worked on BAs, EIAs and ESIAs in South Africa, Uganda, Ethiopia, Namibia and Tanzania as an environmentalist and a social scientist. Takadzani has been mainly involved in projects in the mining sector as well as oil and gas.

1< years with WSP

7 years of experience

Area of expertise

ESIA, EIAs and Bas

Language

English - fluent
Tshivenda - fluent;
isiZulu - conversant;
Sepedi - knowledgeable

EDUCATION

MSc (by dissertation only) in Environmental Science and Geographical Science (GIS) – University of Cape Town	2012
BSc (Hons) Environmental Science and Geographical Science (GIS) – University of Cape Town	2006
BSc Environmental Science and Geographical Science – University of Cape Town	2005

ADDITIONAL TRAINING

Advanced Masters Certificate in Social Impact Assessment (Cum laude) – University of Johannesburg (NQF Level: 8)	2013
Women in Leadership Training offered at UCT (sponsored by Telkom)	2006

PROFESSIONAL MEMBERSHIPS

Candidate Natural Scientist (100117/13) – SACNASP	2013 - to date
Member of the Golden Key International Honour Society	2012 - to date

PROFESSIONAL HISTORY

WSP Africa Group – Senior Environmental Consultant	2022 - present
Golder Trust for Orphans (GTO) – Communication and Marketing Officer	2016 June – 2016 Dec
Golder Associates Africa – Environmental Practitioner	2012 – 2015
Reform Development Consulting (RDC) – Social Science Consultant	2007 - 2010
Centre for Justice and Crime Prevention - Researcher	2011

Takadzani Takalani

Environmental Planning and Advisory, Senior Consultant

PROFESSIONAL EXPERIENCE

ESIA, EIA and BA, Audits

FCC Environmental Compliance Audit
2023
Auditor
Environmental Authorisation and EMPR Compliance Audit

Shell Section 24G Applications
2022-2023
Senior Consultant
Country-wide Section 24G application process for petrol service stations

SASOL Environmental Compliance Audit
2022 – 2023
Auditor
Environmental Authorisation and EMPR Compliance Audit for Sulphuric Acid Tank Storage and the Butanol Complex Facilities

Fine Chemicals Corporation (Pty) Ltd, Basic Assessment, South Africa
2022 to date
Senior Consultant
Basic Assessment for the proposed expansion of the Fine Chemicals Corporation (FCC) Pty Ltd Flammable Drum Storage Facility, Epping Industria 1

Hulamin Campsdrift, ROD Amendment
2014
Environmental Scientist/Project Manager
ROD Amendment of the Proposed Reconfiguration of the Flexible Recycling Remelt at the Hulamin Campsdrift

China National Offshore Oil Corporation (CNOOC), ESIA, Uganda
2014
Environmental Scientist
Environmental and Social Impact Assessment and Environmental Baseline Survey for Kingfisher Discovery Area, Oil and Gas, in Hoima District, Uganda

Vopak South Africa Developments (VSAD), EIA and AEL, South Africa
2014
Environmental Scientist
EIA and AEL for Vopak's Proposed Reatile Bulk Petroleum Products Storage and Distribution Facility in Heidelberg, Lesedi Local Municipality, South Africa

Takadzani Takalani

Environmental Planning and Advisory, Senior Consultant

China National Offshore Oil Corporation (CNOOC), ESIA, Uganda
2013
Social Scientist
Development of a Social Management Framework (high level documents) for an oil and gas project in Uganda

China National Offshore Oil Corporation (CNOOC), ESIA, Uganda
2013
Environmental Scientist
Environmental and Social Impact Assessment for the construction of the Escarpment Road in Hoima District, Uganda

Jindal Iron Ore (Pty) Ltd, Fatal Flaw Analysis, South Africa
2013
Environmental Scientist
Fatal Flaw Analysis of an iron-ore mine in Kwazulu Natal, South Africa

Dundee Precious Metal, ESIA, Namibia
2013
Environmental Scientist
ESIA for the construction of a Sulphuric Acid Plant in Tsumeb, Namibia

Richards Bay Minerals, EIA, South Africa
2012
Environmental Scientist
EIA for the Tailings Treatment Plant for Richards Bay Minerals in northern Kwazulu Natal

African Barrick Gold, EIA, Tanzania
2012
Environmental Scientist
ESIA for the expansion of a tailings storage facilities (TSF) in Bulyanhulu, Tanzania

NYOTA Minerals, ESIA, Ethiopia
2012
Environmental Scientist
Environmental and social impact assessment (ESIA) for a gold mine in Ethiopia (This was a Category A Project according to International Finance Corporation - IFC)

Genderlinks, Research Study, South Africa
2011
Project Manager
Gender-based Violence Study

Takadzani Takalani

Environmental Planning and Advisory, Senior Consultant

The Abdul Latif Jameel Poverty Action Lab (JPAL), Research Study, South Africa
Project Manager
2011
Personal Financial Behaviour Study

Plan International Kenya, Baseline Study, Kenya
Project Manager
2011
Country Baseline Study on health care, education, water and sanitation, food security and mobilisation of community-based organisations.

Resources Aimed at the Prevention of Child Abuse and Neglect (RAPCAN), Research Study, South Africa
Researcher and Project Manager
2010
Adolescent Pregnancy Reduction Programme amongst Grade 8 learners

Sol Plaatjie Municipality in Northern Cape, Strategy Document, South Africa
Researcher and Project Manager
2010
Galeshewe Urban Renewal Programme (GURP) Crime Prevention Strategy, 2010

Department of Community Safety Western Cape, Audits and Safety Plans, South Africa
Researcher
2009-2010
Safety Audits in several municipalities in the Western Cape
Western Cape Community Safety Barometer
Eden District Municipality Safety Plan

The World Bank, Research Study, South Africa
Researcher and Project Manager
2009
Study on crime, violence and the urban poor in eight of the Gauteng Informal Settlements

Government of the Netherlands, Baseline Study, South Africa
Researcher and Project Manager
2009
Baseline Studies to support the implementation of the police service enhancement and crime prevention programme in Paarl and Gugulethu in the Western Cape

German Technical Corporation (GTZ), Impact Evaluation, South Africa
Researcher and Project Manager
2008

Takadzani Takalani

Environmental Planning and Advisory, Senior Consultant

Peace and Development Project (under the City of Tshwane Metro Police) Impact Evaluation in Soshanguve, Pretoria

German Technical Corporation (GTZ), Baseline Study, South Africa
Researcher and Project Manager
2008
Peace and Development Project (under the City of Tshwane Metro Police) Baseline Study in Atteridgeville, Pretoria

UNICEF and the South African National Department of Education, Audit, South Africa
Researcher and Project Manager
2007
South African National Priority Schools Audit

Building 1, Maxwell Office Park
Magwa Crescent West, Waterfall City
Midrand, 1685
South Africa

wsp.com

Annexure B – Butanol complex– ref EM1/1/c)/00/82

Environmental Management Programme Operational Phase

Mitigations measures identified during the environmental impact assessment, for the operational phase of the project, defining the impact management outcome and impact management actions to enable compliance to this regulation.

Impact management Objective	**Impact management action**
1.To minimise the potential of health effects arising from the operation of the plant. To ensure that gaseous emissions are within the limits prescribed by community health screening guidelines." To minimise the potential for health effects arising from the operation of the plant. guidelines To ensure that communities beyond the site boundary are not adversely affected by unpleasant odours. "	1.1 Emission monitoring is done in terms of the applicable Sasol Operation Atmospheric Emission License (AEL)and cumulative impacts will be reported as part of Sasol's permit conditions. 1.2 No uncontrolled venting of n-butanol will be allowed. If it is necessary to do so, this will be limited to conditions of good dispersion potential during planned shutdowns, such as windy daytime atmospheres. 1.3 No uncontrolled venting of n-butyraldehyde or iso-butyraldehyde will be allowed. If it necessary to do so, this will be limited to conditions of good dispersion potential during planned shutdowns, such as windy daytime atmospheres. 1.4 Sasol will appropriately notify affected residents of the time and date of planned shutdowns.
2. Management principles required to manage the blowdown from the cooling towers entering the North Dams	2.1 Discharge of the cooling water will be to one of the effluent dams that are not discharging directly to the Taaibosspruit. This will ensure that, in the event of a leak, contamination is contained. 2.2 Butanol Operations has a valid Service Level Agreement with water and effluent control to enable compliance to this condition. 2.3 The cooling water blowdown will be discharged into separate dams from those receiving high loads of cyanide, to prevent chemical reaction in the case of leaks. 2.4 Butanol Operations has a valid Service Level Agreement with water and effluent control to enable compliance to this condition.

	2.5 Butanol Operations has a valid Service Level Agreement with water and effluent control to enable compliance to this condition. 2.6 In the case of a small fire, fire-fighting run off can be effectively contained in the plant and sampled and disposed of appropriately. In the case of a large fire, however the volume of firefighting runoff will be too large to contain on the plant and will enter North effluent and clean stormwater dams. It is recommended that prior to discharge, the dams be sampled and if necessary the water treated prior to discharge from the site. 2.7 During shutdown of the Butanol Complex the flow to the column to be managed using tanks. 2.8 To prevent excessive COD loadings on the Bioworks, the release from the sump to the chemical sewer after cleaning or malfunctioning/shutdown will be controlled 2.9 The potential impact on the Bioworks during malfunctioning/shutdown will be ascertained once the volume and period of high COD discharge is determined. Chloride concentrations will be monitored initially to ensure that the actual concentrations are not significantly higher than predicted values.
3. To minimise the contamination of ground water as a result of the Butanol Complex activities.	3.1 Ground water contamination can be prevented by ensuring appropriate containment strategies for surface water run-off and operational spills
4. To avoid disturbing noise levels (an increase in the ambient noise level of 7 dB or more at the border of the property from which the noise emanates) as defined by the Free State Noise Regulations.	4.1 Noise generating equipment, such as compressor and turbines will be encapsulated, if necessary, to minimise noise. 4.2 SCI will respond to complaints from the community with regard to increased noise levels as a result of the Butanol Complex which may entail the installation of physical noise attenuation facilities.
5. To reduce the disturbance of the surrounding community from light pollution to a minimum	5.1 Little can be done to mitigate for the light pollution that can be expected from the flares or their visibility during the day. SCI will monitor complaints received regarding light pollution. Should complaints be received on a frequent basis, Sasol will consider the use of visual screening. It would be necessary to locate visual

	screening as close to the viewer as possible. In this regard negotiations with IAPs would be necessary in terms of location and type of visual screening
6. Domestic waste	6.1 All domestic and non-hazardous materials will be disposed of at a permitted general waste site. 6.2 A contractor will collect paper, glass, plastic and cans for recycling.
7.Hazardous solid waste	7.1 Spent catalysts will either be disposed of by a specialist waste contractor at a licensed hazardous waste site or, if possible, returned to the supplier. 7.2 Guard-beds may be replaced during Shutdown years and must be disposed of by a specialist waste contractor at a licensed waste site 7.3 The solid materials from the horizontal flare knock out drum will be disposed of by a specialist waste contractor at a licensed hazardous waste disposal site. The knock out drum will be emptied during shutdowns
8. Cooling tower sludge	8.1 Management of cooling tower sludge from the cooling tower plates and precipitation of salts will be undertaken in association with the overall Sasolburg and operations wastewater site management.
9. Fuel oil stream	9.1 Sufficient storage capacity will be made available for storage of the fuel oils in the event of a malfunctioning of the flare system 9.2 Contingencies will be put into place for handling of spillages of the fuel oils due to leaks in pipes or tanks. 9.3 Tanks will be bunded and runoff will be appropriately diverted.