

Appendix A

Environmental Assessment Practitioner (EAP)

- HydroScience Company Profile
- Curriculum Vitae – Paulette Jacobs
- Curriculum Vitae – Louise van Wyk

COMPANY PROFILE

The Business and its Services

HydroScience is an environmental, water and waste management solutions provider. We combine our expertise in water quality, water and waste management as well as risk and impact assessment with our project management skills to meet the requirements of our clients.

HydroScience offers the following services:

- Water management
- Environmental Impact Assessments (EIA)
- Public Participation Processes
- Waste management
- Application for licences and authorisations required according to the latest legislation
- Legal compliance assessments
- Feasibility studies
- Project management
- Information management

HydroScience has assisted the mining, industrial, governmental, construction, conservation and recreational sectors in dealing with environmental and water management issues.

Our Mission: We strongly believe in sustainable development but are also passionate about protecting our environment for current and future generations to appreciate. It is in attaining this balance that our challenge lies.

We have a good working relationship with our clients and are well respected by them as is evident from the fact that the company has been operating for 10 years through word-of-mouth marketing only. HydroScience will ensure the satisfaction of our clients irrespective of the lengths we have to go to and generally we excel and exceed our clients' expectations.

We take great pride in our reputation encompassing strong business ethics, honesty, integrity and determination.

Management & Ownership

HydroScience is 100% owned by previously disadvantaged individuals (PDI).

75% of the workforce are women.

Paulette Jacobs (nee du Plessis) is the Managing Director and Owner of HydroScience.

Paulette completed her studies in chemistry & biochemistry at RAU (now University of Johannesburg). She started her career at the CSIR as a water, waste and effluent treatment industrial scientist where she conducted research in water treatment technologies (chemical & biological processes for sulphate reduction & neutralisation). During this time she also co-authored a number of publications. After 8 years at the CSIR, Paulette joined Pulles, Howard & de Lange Water Quality Management Consultants where she managed a number of international, national and Water Research Commission projects and received training on Environmental Pathway Analyses in Canada. Paulette then joined the water and environmental technology section at SRK Consulting Engineers and did a course on hazardous waste management at Pretoria Technicon. In the year 2000, Paulette started her own consulting firm.



Paulette Jacobs

Abbreviated Project List and Experience

Legal compliance

- Environmental authorisations for activities which have the potential to detrimentally impact on the environment:
Environmental Impact Assessments (EIA) and Environmental Management Programmes (EMP) in terms of the National Environmental Management Act (NEMA), 1998 (Act 107 of 1998) for township establishments; residential (estates), business (offices), commercial & retail (shopping malls), industrial (manufacturing & processing plants) and other (hospitals, educational etc) developments; building of infrastructure or facilities (transport, storage, electricity); infrastructure or facilities in water sensitive areas (wetlands, streams); water abstraction; transformation of areas; decommissioning; recommissioning; filling stations; release of emissions, pollution, effluent or waste; rectification of unlawful commencements or continuation of listed activities (Section 24G).



Oil refinery



Township layout

- Water use licence applications for water uses identified in terms of Section 21 of the National Water Act, 1998 (Act 36 of 1998):
Integrated water and waste management plans (IWWMP), technical support documentation and Department of Water Affairs' water use registration forms for mines, industry and others, concerning the taking of water from a resource; impeding or diverting flow of water in a water course; discharging waste or water containing waste into a water resource; disposing of waste or wastewater; altering the bed, banks, course or characteristics of a water course; removing, discharging or disposing of water found underground.

Water licenses required

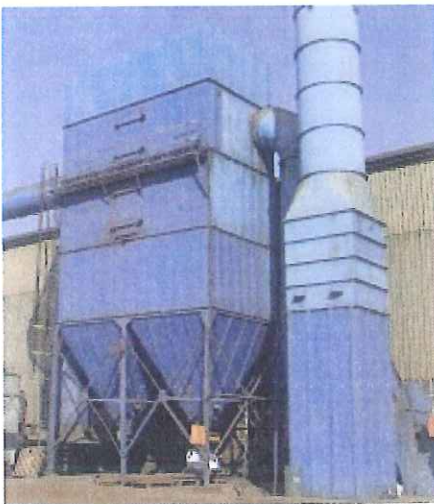


Discharge into a water resource



Groundwater abstraction from a borehole

- Waste licences in terms of the National Environmental Management Waste Act, 2008 (Act 59 of 2008).
- Atmospheric Emissions Licences in terms of the National Environmental Management Air Quality Act, 2004 (Act 39 of 2004) in collaboration with EHRCON.
- Enviro-legal assessments in terms of water and waste management.



Atmospheric emissions licence required: Bag house



Waste licence required: Waste processing - screening & separation

Water management

- Water treatment – identification and evaluation of chemical and biological treatment processes.
- Water quality – data collection (monitoring); information management (database); evaluation and review (data validity); interpretation (trends); assessments (compliance); pollution movement and pollution source.
- Water balances – environmental and water and salt balances.

- Storm water management.



Acid mine drainage impacting on the environment



Erosion caused by poor storm water management

Waste management

- Landfill gas and water monitoring evaluations.
- Waste characterisation and management – mine, industrial and hazardous
- Closure and rehabilitation of waste management facilities



General waste dumping



Hazardous waste disposal facility with HDPE liner

Mining

- Environmental Management Programme Reports (EMPR) updates, addendums and amendments – scoping reports, full EIA and EMPR.
- Water supply and management
- Rehabilitation – post decommissioning and closure; planning



Coal mine



Aerial view of an industrial site

Project management

- Management of international (Canada), national, Water Research Commission (WRC), Department of Water Affairs and other large projects – management of schedule, finance, resources, deliverables, quality control etc.

Guidelines

- Best Practice Guidelines for Water Resource Protection in the South African Mining Industry – integrated mine water management; water reuse & reclamation; water treatment; storm water management; water and salt balances; water monitoring systems; water management in hydrometallurgical plant.

Abbreviated Client List

- Aflease Dominion Reefs (Mining - Uranium)
- Africon (Consulting firm)
- Aquatic Weed Control (sterile grass carp)
- Barberton mines (Mining - Gold)
- Blue Consult Engineering (Walter Stallman)
- Department of Water Affairs (Best Practice Guidelines for the mining industry)
- Digby Wells & Associates (Consulting firm – Graham Truster)
- Eastplats (Mining - Platinum)
- Ecodynamics (Rehabilitation etc)
- Environmental Resource Management (ERM – Consulting firm)
- EPS Consulting Engineers
- Escom
- Exarro Belfast Glisa (Mining - Coal)
- Exol Oil Refinery
- Foskor (Mining)
- Geo-logic Trading Trust (Consulting firm – Henk Kruidenier)
- Golder Associates Africa (Consulting firm – Dr Andrew Brown)
- Highveld Steel and Vanadium (Industrial manufacturing)
- Information Decision Systems (IDS – Consulting firm)
- Investment companies
- Jacana Environmentals (Consulting firm – Marietjie Eksteen)
- Jubilee Platinum (Mining & industrial)
- Jubilee Smelting & Refining (Industrial)
- Local municipalities (Rustenburg, Midvaal, Ekurhuleni)
- Modder East Mine (Mining - Gold)
- Molemo Consulting Engineers
- Nuclear Energy Corporation of South Africa (NECSA)
- Oilkol (Oil recycler)
- Placer Dome (Mining - Gold)
- Prime Resources (Consulting firm – Peter Theron)
- Property Development Groups
- Safeline Brakes (Industrial – Manufacturing)
- Steffen Robertson & Kirsten Consulting Engineers & Scientists
- Thos Begbie and Co (Industrial – Foundry)
- Ticor (Industrial)
- Towncomp Planning Projects (Pieter de Jager)
- Town Planners
- Transalloys (Industrial - Processing)
- Tubatse Ferrochrome
- Vanchem Vanadium Products (Industrial – Processing and Manufacture)
- Wescoal Mining (Mining and Processing - Coal)
- Xtrata Atcom South (Mining - Coal)

Contact us

Company registration number: 2008/056910/23

VAT registration number: 4700236427

Postal address: P.O. Box 1322
Ruimsig
1732

Fax: +27(0) 86 692 8820
+27(0) 86 588 1770

Phone: +27(0) 82 850 5482

Website: www.hydroscience.co.za

Email: paulette@hydroscience.co.za

Contact person: Paulette Jacobs



CURRICULUM VITAE – PAULETTE JACOBS

Nationality	South African
Date of Birth	1968-05-26
Profession	Water quality management and environmental scientist
Specialisation	Water Quality Assessment and Management, Environmental Impact Assessments, Water use licenses, Environmental and Water Management Plans, Integrated Water and Waste Management Plans, Water, Waste and Environmental Technology

Expertise

- **Project management (multi-national projects)**
- **Water management**
- **Chemical and biological treatment processes for the improvement of water quality (especially sulphate reduction and neutralisation)**
- **Specialist water quality input into various projects**
- **Solid waste management (including general, mine and industrial waste)**
- **Environmental Impact Assessments (EIA)**
- **Environmental and Water Management Plans and reports (EMP)**
- **Water Use Licence Applications (WULA) and technical support documents**
- **Integrated Water and Waste Management Plans and reports (IWWMP)**
- **Environmental issues identification**

Qualifications

Bachelor of Science (Physical Sciences) Majored in chemistry / biochemistry	RAU, Johannesburg, 1990
Short course: Environmental pathway analysis	Senes (Canada), 1997
Short course: Hazardous waste management	Technikon Pretoria, Department of Environmental Health in association with Wastetech, 1998
Short course: Environmental awareness & ecology	Bushveld Training Adventures, 2006

Career summary

August 2000 - Present:	Independent consultant (HydroScience cc)
June 1998 – July 2000	SRK Consulting Scientist in Water and Environmental Technology
October 1996 – May 1998	Pulles, Howard & de Lange (PHD) Water Quality Management Consultants Senior Environmental Scientist
January 1990 – September 1996	Council for Scientific and Industrial Research (CSIR) (research and development institution) Information Scientist and Industrial Chemist in waste, water and effluent treatment

Project Management:

Managed a number of large projects with substantial budgets that involved the participation of project team members from other countries (such as Canada and Germany), or other companies (other than the company managing the project, i.e. WRC and DWA projects that involved the participation of different consulting companies).

Environmental Impact Assessments (EIA) and Environmental Management Programme Reports (EMP):

- Process (requirements, negotiation with authorities, flow of process).
- Environmental legislation (applicable Acts, regulations, guidelines etc).
- Public participation and/or stakeholder engagement.
- Preparation of documentation according to guidelines (new projects, updates/upgrades, addendums).
- Environmental pathway analyses.
- EIA in sensitive water environments (wetlands, diversion and/or canalisation of watercourse etc)

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- EIA documentation for mines, industries, guest lodges, township developments, townhouse/cluster complexes, business complexes & commercial developments, retail & shopping complexes, breeding of sterile fish for the control of aquatic weeds etc.
- Prospecting EMPR's (Versatex).
- Independent review of EIA documentation.

Water management:

- Information management (development and management of databases, Waterlit).
- Running and monitoring of laboratory and pilot plant test units for water treatment (iron oxidation, biological COD removal from an industrial effluent, neutralisation, many sulphate reduction processes).
- All aspects of the water management hierarchy (pollution prevention; reduction or minimisation of pollution at source, including storm water management; reuse/recycle/reclaim; treatment; disposal/discharge).
- Evaluation and interpretation of water quality information.
- Effluent discharge impacts (Crocodile River Mine and Aflase Uranium in Dominionville & Modder East dewatering).
- Integrated Water and Waste Management Plans (Transalloys, Vanchem Vanadium Products, Evander Gold Mines)
- Specialist water quality input (into EMPR's and EIA's).
- Enviro-legal assessments in terms of water and waste – regulatory requirements; assessment of compliance.
- Water use registrations.
- Water use licence applications (WULA – Ticor CPC, Impala platinum, Aflase Uranium, Vanchem Vanadium Products, Transalloys, Aflase Gold Modder East, Retail Centre) and supporting technical documentation (integrated water and waste management plans).
- Water management plans (setting achievable water quality objectives not compromising the receiving environment and post closure liabilities).
- Environmental water and salt balances (water management tool).
- Water monitoring.
- Human health risk assessments as well as environmental risks.
- Mine water specialist.
- Best Practice Guidelines for Resource Protection in the South African Mining Industry (for Department of Water Affairs) on storm water management, water reuse and reclamation, water and salt balances, small-scale mining, water monitoring, water treatment, pollution prevention, hydrometallurgical processing plants

Solid waste management:

- Assessment of waste handling facilities - adequacy or need for additional facilities, audits, prevention of water pollution, compliance with regulations (industries and mines).
- Classification, handling, transport, treatment and disposal of hazardous or industrial waste (course through Pretoria Technicon in association with Wastetech).
- Assess environmental impacts due to waste disposal activities (anthrax risk through disposal of animal carcasses, water contamination).
- Registration of waste disposal facilities & transfer stations based on Section 20 of ECA and NEMWA waste licence applications.
- Cost of waste management and the funding thereof (factors to consider for costing and economic instruments to fund waste management – National Department of Environment).
- Closure certificates (Oilkol, NECSA, Tubatse Ferrochrome, Xtrata Atcom South)

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- Recycling and waste minimisation (opportunities for Small, Medium and Macro Enterprises, making it financially viable and sustainable in a third world country).
- SRK training course to Gauteng DACE on different aspects of waste monitoring and management.

Other:

- Radiological risk assessments (background studies, field work, preparation of documentation to regulator). In co-operation with Senes Consultants Limited (Canada) and Brenk Systemplanung (Germany). Training received in Canada (Senes).
- Training workshop presentation on radiation (Gauteng DACE)
- Landfill gas monitoring.
- Assessment for closure planning and rehabilitation.
- Due diligence.

Publications

Co-author of various publications / technical papers on water treatment:

- Treatment / neutralisation of acidic effluents with limestone.
- Treatment of sulphate-rich mining effluents (integrated passive treatment systems for post-closure; by-product recovery; use of barium hydroxide; use of biological processes with different energy sources).
- Anaerobic treatment of gelatine factory effluents.
- Department of Water Affairs Best Practice Guideline Series on Resource Protection for the South African Mining Industry (water reuse & reclamation; hydrometallurgical processing plants; etc)

Affiliations

Registered as Professional Natural Scientist with the South African Council for Natural Scientific Professions (SACNASP)

Registered with the Field Guiding Association of South Africa (FGASA)

Chairperson of the Bankenveld Botanical Society of South Africa.

Language proficiency

Afrikaans and English (speak, read, and write)



CURRICULUM VITAE – LOUISE VAN WYK

Nationality	South African
Date of Birth	1984-10-04
Profession	Environmental scientist and Ecologist
Specialisation	Fauna and Flora studies, Mitigation and Management of the Ecological Environment, Biodiversity Action Plans, Environmental Impact Assessments

Expertise

- **Environmental pre-feasibility studies for gold tailings reclamation, iron ore mining and other mining projects.**
- **Biodiversity Assessments including Flora, Mammalia, Avifauna, Herpetofauna and Arthropoda**
- **Research in conservation methods and environmental health**
- **Impact assessments based on the terrestrial environment**
- **Biodiversity Action Plans (BAP), rehabilitation and monitoring methods**
- **Ecological auditing, permit application and species relocation**
- **Project management of ecological specialist studies**
- **Environmental Impact Assessments (EIA)**
- **Environmental and Water Management Plans and reports (EMP)**

Qualifications

Bachelor of Science (Biological Sciences) Majored in zoology / botany	RAU, Johannesburg, 2005
Bachelor of Science Honours Biodiversity and Conservation	UJ, Johannesburg, 2006
Masters of Science Environmental Management	UJ, Johannesburg, 2009
Short course: Technical Writing	Golder Associates (Midrand), 2009
Short course: Project Management	Golder Associates (Midrand), 2008
Short course: Wildflower Identification Course	Africa Land Use Training, 2009
Short course: First Aid Training Level 1	Golder Associates (Midrand), 2009
Short course: Snake ID and Snakebite treatment	African Reptiles and Venom, 2011
Short course: Venomous Snake handling	African Reptiles and Venom, 2011
Short course: Risk Assessment and Facilitation	Phil Tanner, 2012
Land Rehabilitation Workshop	Phil Tanner, 2011.

Career summary

April 2012 - Present	HydroScience cc Environmental Consultant and Ecologist
January 2011 – April 2012	Digby Wells Environmental (Pty) Ltd Terrestrial Ecologist and Environmental Consultant
June 2008 – December 2010	Golder Associates (Pty) Ltd Terrestrial Ecologist and Environmental Consultant
February 2008 – June 2008	Paulette Jacobs Consulting (HydroScience cc) Environmental Consultant (Free-lance)
February 2007 – June 2007	Wildlife Biological Resource Centre Research Assistant

Project Management:

Managed a number of biodiversity projects that were undertaken for the development of large mining projects that involved the participation of project team members from other companies and authorities.

Environmental Impact Assessments (EIA) and Environmental Management Programme Reports (EMP):

- Process (requirements, negotiation with authorities, flow of process).
- Environmental legislation (applicable Acts, regulations, guidelines etc).
- Public participation and/or stakeholder engagement.
- Preparation of documentation according to guidelines (new projects, updates/upgrades, addendums).
- Environmental audits based on EMP guidelines.

Biodiversity management:

- Terrestrial survey and reporting on the Mammalia, Avifauna, Herpetofauna, Arthropoda and Flora.
- Assessments associated with the impacts on the terrestrial environment and development of management measures.
- Terrestrial assessment on national (North-West, Gauteng, Freestate, Limpopo, Mpumalanga, Northern Cape) and international projects (Ghana, Botswana, Sierra Leone and Mozambique).
- Project experience includes urban and large mining developments (Vaal Life X; SANRAL Swartkopfontein; Rustenburg Landfill Site; Rand Uranium; Belfast NBC; Foskor PEP 3; Moatize Rio Tinto; WUC Pipeline; SASOL Synfuels Secunda; Koidu Holdings Kimberlite mine; Anglo Gold Ashanti; AngloCoal; Temo Coal Waterberg; and Eastplats Sekhukhuneland).
- Sensitivity assessment based on Red Data and protected species or sensitive vegetation communities/ecological systems.
- Fauna and flora assessment to determine the ecological integrity for the purpose of rehabilitation monitoring.
- Permit application for translocation, handling and capture of sensitive and TOPS species.
- Relocation procedures of TOPS species including Grass Owl and Rock Python.
- Ecological audits to determine sensitive ecological areas and possible mitigation.
- Biodiversity Action Plans (BAP) for large mining projects (AngloCoal, Mpumalanga)
- Nursery plan and procedures of sensitive species for purpose of rehabilitation after life of mine.
- Biomonitoring of the Olifants and Selati River through the application of VEGRAI 3 for PMC, Palaborwa.
- Ecological study on the relocation of *Protea gaguedi*, including methods on relocation of *Protea* species, probability of survival, procedures to follow, permit application and possible locations for *Protea* relocation

Other:

- Water use licence applications (Mooifontein, Mpumalanga).
- Training field surveys on fauna and flora survey methods

Publications

Publications / technical papers on environmental studies:

- The comparison of four semen extenders in the preservation of epididymal sperm of Zebra (*Equus burchellii*) and Black Wildebeest (*Connochaetes gnou*), July 2006
 - Kruger National Park - The Relationship between Tourism and Artificial Waterholes and its Ecological Implications, November 2009
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Affiliations

Member of the Zoological Society of Southern Africa (ZSSA)
Registration underway as a Professional Natural Scientist with the South African Council for Natural Scientific Professions (SACNASP)

Language proficiency

Afrikaans and English (speak, read, and write)