DACUM Panel

1. Mr. Maheshwar Prasad Yadav
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2. Mr. Puskar Shrestha
   Alternative Energy Promotion Centre
3. Er. Kalidas Neupane
   Free-Lancer, Kathmandu
4. Mr. Hari Bdr. K.C.
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5. Ms. Bindu Manandhar
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6. Mr. Ramesh Nath Regmi
   Junior Officer, BSP-Nepal
7. Mr. Mahaboob Siddiki
   Officer, R&D Dept., BSP-Nepal
8. Er. Prakash Lamichhane
   Manager, R&D Dept., BSP-Nepal
9. Ms. Rama Thapa Chhetri
   BSP- Nepal
10. Er. Khagendra Nath Khanal
    Asst. Director, BSP-Nepal
11. Er. Charushree Nakarmi
    Officer, NPW Division, BSP-Nepal
12. Mr. Min Prasad Basnet
    Junior Officer, NPW Division, BSP-Nepal

DACUM Facilitator/Recorder

Mr. Ram Hari Devkota, NSTB/CTEVT
Er. Gunananda Jha, NSTB/CTEVT
Mr. Santosh Mahaseth, NSTB/CTEVT

Coordinator

Prof. Dr. Jagannath Shrestha
Coordinator, Renewable Energy
NSTB/CTEVT

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   Chairperson, Nepal Energy Development Company
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10. Mr. Shreeram Adhikari
    Manager, RGG, Lalitpur
11. Mr. Surya Prakash Hada
    GM, GGC, Kathmandu

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Er. Gunananda Jha, NSTB/CTEVT

Technical Sub-Committee

1. Prof. Dr. Jagannath Shrestha- Coordinator
   IOE, Pulchowk Campus.
2. Mr. Chandra Bhakta Nakarmi,- Member
   Director, NSTB, Bhaktapur
3. Mr. Govinda Prasad Devkota,- Member
   Chairperson,Universal Consultancy Services,Balaju
4. Dr. Amrit Bahadur Karki,- Member
   Chairperson, BSP- Nepal
5. Er. Bhai Raja Manandhar,- Member
   Senior Div. Engineer, Min. of Environment
6. Mr. Samir Thapa,- Member
   Senior Energy Officer, AEPC, Lalitpur
7. Mr. Surendra Lal Shrestha,- Member
   Executive Member, BSP- Nepal.
8. Er. Khagendra Nath Khanal,- Member
   Assistant Director, BSP-Nepal.
9. Mr. Deepak Prasad Poudel,- Member
   Dy. Director, CTEVT/NSTB
10. Er. Gunananda Jha- Member
    Skill Testing Officer, CTEVT/NSTB
11. Mr. Govind Poudel – Member Secretary
    Skill Testing Officer, NSTB/CTEVT

Occupational Profile

of

Biogas Technician, L-4

(DACUM Workshop on 26-27 July, 2009)

(Verified DACUM Workshop on 31 July 2009)

(Technical Sub Committee Meeting 11th August, 2009)

Council For Technical Education and Vocational Training

NATIONAL SKILL TESTING BOARD

Madyapur Thimi 17, Sanothimi, Bhaktapur

Nepal

(NSTB approval date …….)

DUTIES and TASKS

A. Conduct Study Work

A1 Conduct orientation program			A2 Identify availability of feeding material			A3 Identify availability of local construction material			A4 Verify technical parameters		
Task rating			Task rating			Task rating			Task rating		
Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency
3	1	3	3	3	3	3	1	3	3	1	2
A5 Identify availability of construction material in local market			A6 Study of resources (Human, machine, money)			A7 Study of energy use pattern			A8 Interact with concerned stake holders		
Task rating			Task rating			Task rating			Task rating		
Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency
3	1	2	3	1	1	3	1	1	2	1	1
A9 Identify potential users			A10 Conduct socio-economic impact study			A11 Prepare feasibility study report			A12 Check willingness of private sector in plant construction		
Task rating			Task rating			Task rating			Task rating		
Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency
3	1	1	3	2	1	3	2	1	3	2	1

B. Identify End use of Biogas

B1 Apply as heat energy			B2 Apply as light energy			B3 Apply as electricity generation			B4 Apply as mechanical energy		
Task rating			Task rating			Task rating			Task rating		
Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency
3	1	1	2	1	1	2	3	1	2	3	1
B5 Apply as refrigeration			B6 Apply as chemical treatment (preservation)								
Task rating			Task rating								
Importance	Difficulty	Frequency	Importance	Difficulty	Frequency						
2	3	1	1	3	1						

C. Design Biogas Plant

C1. Analyze data from the study			C2. Select the appropriate model			C3. Design of appropriate size			C4. Prepare drawing		
Task rating			Task rating			Task rating			Task rating		
Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency
3	3	2	3	2	1	3	3	1	3	2	1
C5. Prepare specification of material			C6. Prepare specification of work								
Task rating			Task rating								
Importance	Difficulty	Frequency	Importance	Difficulty	Frequency						
3	3	1	3	3	1						

D. Perform Estimating & Costing

D1. Conduct quantity survey			D2. Collect market rate			D3. Analyze the rate			D4. Prepare bill of quantity		
Task rating			Task rating			Task rating			Task rating		
Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency
3	2	1	3	2	1	3	2	1	3	2	1
D5. Determine project cost			D6. Allocate the budget								
Task rating			Task rating								
Importance	Difficulty	Frequency	Importance	Difficulty	Frequency						
3	3	1	3	3	1						

E. Conduct training

E1. Develop training curriculum for Mason/Supervisor/Users/ Stakeholders			E2. Prepare training manual for Mason/Supervisor/Users			E3. Conduct business counseling training for stakeholders			E4. Conduct mason training		
Task rating			Task rating			Task rating			Task rating		
Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency
3	3	1	3	3	1	3	2	1	3	3	1
E5. Conduct supervisor training			E6. Conduct after sales service (ASS) training for technicians			E7. Conduct operation & maintenance training for users/owners			E8. Conduct slurry management training for users/owners		
Task rating			Task rating			Task rating			Task rating		
Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency
3	3	3	3	3	1	3	3	3	3	3	3

DUTIES and TASKS

E9. Conduct GPS (Global position system) operation training for technician/manager			E10. Conduct promotion & management training for manager/supervisor			E11. Conduct training for appliances manufacturing technicians		
Task rating			Task rating			Task rating		
Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency
3	3	1	3	3	1	3	3	2

F. Perform Construction Work

F1 Select site			F2 Layout the plant			F3 Check & collect construction material			F4 Perform excavation work		
Task rating			Task rating			Task rating			Task rating		
Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency
3	2	1	3	1	1	3	2	1	3	2	3
F5. Perform soil compaction			F6. Perform soling (Brick & Stone) work			F7. Perform masonry (Brick/Stone) work			F8. Conduct slump test		
Task rating			Task rating			Task rating			Task rating		
Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency
3	3	3	3	1	3	3	2	3	3	2	1
F9. Perform PCC work			F10. Perform simple scaffolding work			F11. Perform simple shuttering work			F12. Perform simple reinforcement work		
Task rating			Task rating			Task rating			Task rating		
Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency
3	2	3	3	3	1	3	3	1	3	2	1
F13. Perform domecast			F14. Perform plastering work			F15. Perform dome treatment work			F16. Perform back filling work		
Task rating			Task rating			Task rating			Task rating		
Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency
3	3	1	3	2	2	3	3	1	3	1	2
F17. Perform pipe fitting work			F18. Install the end use appliances (stoves, lamp, generator, expeller, hauler, grinder)			F19. Perform top filling			F20. Construct compost pit		
Task rating			Task rating			Task rating			Task rating		
Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency
3	2	1	3	1	1	3	1	1	3	2	1
F21. Conduct leakage test			F22. Operate plant								
Task rating			Task rating								
Importance	Difficulty	Difficulty	Importance	Difficulty	Difficulty						
3	3	3	2	3	3						

G. Perform supervision work

G1. Prepare work plan			G2. Check the dimension as per drawing			G3. Inspect quality of material (construction, feeding, end-use appliances)			G4. Inspect quantity of material as per requirement		
Task rating			Task rating			Task rating			Task rating		
Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency
3	2	1	3	1	1	3	3	1	2	1	1
G5. Instruct users /company/sub-ordinate			G6. Conduct quantity measurement			G7 Prepare/check bill			G8. Recommend for payment		
Task rating			Task rating			Task rating			Task rating		
Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency
3	2	1	3	2	1	3	1	1	3	1	1
G9. Update quality standard											
Importance	Importance	Difficulty									
3	3	1									

DUTIES and TASKS

H. Utilize Slurry as Bio-fertilizer

H1. Orient about uses of bio-slurry (solid/liquid)			H2. Prepare standard for application			H3. Prepare composting method			H4. Orient about application of bio-fertilizer		
Task rating			Task rating			Task rating			Task rating		
Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency
2	2	1	3	3	1	3	2	1	3	2	1

H5. Orient about safety/effect of bio-fertilizer		
Task rating		
Importance	Difficulty	Frequency
2	2	1

I. Prepare Proposal/Report

I1. Prepare proposal			I2. Prepare construction completion report			I3 Prepare ASS (After Sale Service) report			I4. Prepare quality control report		
Task rating			Task rating			Task rating			Task rating		
Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency
3	3	1	3	2	1	3	1	1	3	2	1

I5. Prepare slurry report			I6. Prepare plant testing report			I7. Prepare workshop (appliances manufacturing) report			I8. Prepare R&D report based on available plant /appliances designs		
Task rating			Task rating			Task rating			Task rating		
Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency
3	2	1	3	3	1	3	2	1	3	3	1

I9. Prepare verification/inspection report			I10. Prepare final report		
Task rating			Task rating		
Importance	Difficulty	Frequency	Importance	Difficulty	Frequency
3	1	1	3	2	1

J. Evaluate the project

J1. Prepare check list			J2. Develop questionnaire			J3 Pretest/ finalize questionnaire			J4. Prepare format/database		
Task rating			Task rating			Task rating			Task rating		
Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency
3	2	1	3	3	1	3	2	1	2	3	1

J5. Conduct sampling			J6. Conduct interview/observation & measurement			J7. Tabulate & analyze data			J8. Prepare evaluation report		
Task rating			Task rating			Task rating			Task rating		
Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency	Importance	Difficulty	Frequency
3	2	1	3	3	1	3	3	1	3	3	1

J9. Evaluate socio-economic benefit		
Task rating		
Importance	Difficulty	Frequency
3	3	1

Rating options:

0= No **1= Low** **2= Medium** **3= High**

Additional Information for Job Title

Worker traits	**Entry Requirements**	**Career Path**
Honest, Patience, Hard worker, Polite, Good listener, Pleasant voice, Healthy, Confident, Competent, Leadership, Disciplined, Punctual, Innocent, Visionary, Creative, Motivated, Tidy, Energetic.	- BE/BSc/B.Tech in Engineering (any discipline) + 2 years working experience in Biogas Sector Or - BE/BSc/B. Tech in any discipline +3 Months training (300 Hrs.) in biogas Or - Diploma in Civil/Mechanical/Electrical Engineering + 5 years working experience as Bio-gas Technician Or - Diploma in Civil/Mechanical/Electrical Engineering + 3 years working experience as Bio-gas Technician + 1 year training in relevant field Or - Skill Test Level 3 passed in relevant occupation + 3 years working experience as biogas technician + 1 year training in relevant field Or - As per NSTB Rules	**Biogas Advisor**

DUTIES and TASKS

Technical Knowledge

- Knowledge on bio-gas & it's importance, uses & benefits.
- Knowledge on gas fermentation process.
- Knowledge on feeding materials.
- Knowledge on application of bio-gas.
- Knowledge on component of bio-gas.
- Knowledge on history of bio-gas.
- Knowledge on design/model of bio-gas.
- Knowledge on building materials & standard.
- Knowledge on report/proposal writing.
- Knowledge on communication & negotiation skill.
- Knowledge on facilitation & presentation skill.
- Knowledge on bio-slurry utilization and application.
- Knowledge on cost calculation/site selection.
- Knowledge on estimation/design.
- Knowledge on computer application.
- Knowledge on construction/measurement tools.
- Knowledge on basic construction management & supervision.
- Knowledge on global warming & CDM.
- Knowledge on troubleshooting in bio-gas.
- Knowledge on effect of gas leakage.
- Knowledge on safety.
- Knowledge on socio-economic survey.
- Knowledge on nutrition value (NPK) of bio slurry.
- Knowledge on composting, procedure & storage.
- Knowledge on composition of bio-gas.
- Knowledge on data collection, processing & analyzing.
- Knowledge on fermentation parameters.
- Knowledge on marketing.
- Knowledge on design parameters.
- Knowledge on quality management system.
- Knowledge on co-ordination & networking.
- Knowledge on basic engineering drawing.
- Knowledge on engineering norms.
- Knowledge on measurement, unit & conversion.
- Knowledge on bond pattern.
- Knowledge on basic plumbing/shuttering/scaffolding.
- Knowledge on simple structural analysis.
- Knowledge on water proofing/leakage tightening.
- Knowledge on appliance arrangement, standard & specification.
- Knowledge on tools & technique of training.
- Knowledge on GPS handling system.
- Knowledge on planning for supervision.
- Knowledge on basic financial management.
- Knowledge on project evaluation.
- Knowledge on basic sampling technique.
- Knowledge on basic questionnaire, observation, PRA.
- Knowledge on socio, culture, economic impact effect.
- Knowledge on basic principle of energy.
- Knowledge on cost benefits analysis.
- Knowledge on government policy.

Tools/Equipment

- Stationary/ drawing tools
- Weighing Machine
- Measuring Tape
- Bucket
- Calculator/ computer
- Drawing equipment.
- Mason thread, lime, trowel, plumbob, pan.
- Sprit level, pipe level.
- Hammer
- Shovel
- Hacksaw
- Pick axe
- Crow bar
- Die set
- Pipe wrench
- Foot pump
- Temping foot
- Slump box
- Plier
- Wooden saw
- Dome template
- Finishing trowel
- Painting brush
- Heating plate
- Thermochrome
- Teflon cover
- GPS set
- Needle
- File set
- Sand Paper
- Vernier Caliper
- Pit plier
- Gas analyzer
- Folding rod
- Gloves
- Safety helmet
- Safety goggles
- Safety shoes
- Apron
- Pressure meter
- Thermometer
- Lux meter
- Voltmeter
- Mechanical Workshop

DUTIES and TASKS