Document 530
PRE-MONITORING & EVALUATION REPORT

CHAPTER: Oregon State University
COUNTRY: Kenya
COMMUNITY: Lela
PROJECT: Lela Community Water Project
TRAVEL DATES: July 3 to August 1, 2014

Prepared By
Christopher Hinkle
Judy Jiang
Katherine Lanfri
Martha McAlister
Jeffery Randall (mentor)
Jaynie Whinnery (mentor)

May 17, 2014

ENGINEERS WITHOUT BORDERS-USA
www.ewb-usa.org

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Pre-Monitoring & Evaluation (M&E) Report Part 1 – Administrative Information

1.0 Contact Information

Project Title	Name	Email	Phone	Chapter Name or Organization Name
Project Lead	Martha McAlister	kenya@ewb-osu.org		EWB-OSU
President	Sonja Michelsen	president@ewb-osu.org		EWB-OSU
Responsible Engineer in Charge	Jeffery Randall			CH2MHill (retired)
Traveling Mentor	Jaynie Whinnery			EWB-OSU
Faculty Advisor	Lewis Semprini			OSU
Health and Safety Officer	Christopher Hinkle			EWB-OSU
Assistant Health and Safety Officer	Judy Jiang			EWB-OSU
Education Lead	Martha McAlister			EWB-OSU
Planning, Monitoring, Evaluation and Learning (PMEL) Lead	Judy Jiang			EWB-OSU
Community Contact	Paul Olang'o			Lela, Kenya

2.0 Travel Team

#	Name	E-mail	Phone	Chapter	Student or Professional
1	Martha McAlister	kenya@ewb-osu.org		EWB-OSU	Student
2	Judy Jiang			EWB-OSU	Student
3	Christopher Hinkle			EWB-OSU	Student
4	Jaynie Whinnery			EWB-OSU	Professional

3.0 Health and Safety

The travel team will follow the site-specific Health and Safety Plan (HASP) that has been prepared for the 2014 Monitoring & Evaluation trip. The HASP will be submitted along with this pre-trip report.

4.0 Planning, Monitoring, Evaluation and Learning

4.1 The travel team has reviewed the 901B – Program Impact Monitoring Report template and has assigned travel team members to complete this report during the upcoming trip. We acknowledge that the completed 901B is required with the eventual submittal of the 531 – Post-Monitoring & Evaluation Trip Report. _X_Yes ___No

4.2 Final M&E Trip For Program: Yes__ No __ Unknown_X_

5.0 Budget

5.1 Project Budget

Project ID: ___5091____
Type of Trip: ___M_____

Trip type: A= Assessment; **I**= Implementation; **M**= Monitoring & Evaluation

Trip Expense Category	Estimated Expenses
Direct Costs	
Travel	
Airfare	$8,000
Taxis/Drivers	$400
Travel Sub-Total	$8,400
Travel Logistics	
Exit Fees/ Visas	$200
Inoculations	$300
Insurance	$250
Misc.	$400
Travel Logistics Sub-Total	$1,150
Food & Lodging	
Lodging	$300
Food & Beverage (Non-alcoholic)	$600
Food & Lodging Sub-Total	$900
Labor	
In-Country logistical support	$450
Local Skilled labor	$40
Labor Sub-Total	$490
EWB-USA	
Program QA/QC	$1,150
EWB-USA Sub-Total	$1,150

Project Materials & Equipment (Major Category Summary) add rows if needed	
Water quality testing	$900
Project Materials & Equipment Sub-Total	$900
Misc. ***(Major Category Summary)***	
Report Preparation	$50
Misc. Sub-Total	$50
TOTAL	$13,040

EWB-USA Headquarters use:

Indirect Costs	
EWB-USA	
Program Infrastructure	$350
Sub-Total	$350
TRIP GRAND TOTAL (Does not include Non-Budget Items)	$13,390

Non-Budget Items:

Additional Contributions to Project Costs	
Community	
Lodging	$150
Community Sub-Total	$150
EWB-USA Professional Service In-Kind	
Professional Service Hours	260
Hours converted to $ *(1 hour = $100)*	$26,000
Professional Service In-Kind Sub-Total	$26,000
TRIP GRAND TOTAL (Includes Non-Budget Items)	$39,540

Chapter Revenue

Funds Raised for Project by Source	**Actual Raised to Date**
Source and Amount *(Expand as Needed)*	
Corporations	$610
University	$1,200
Grants - EWB-USA program	$4,000
Individuals	$2,752.52
Special Events	$3,573.11
EWB-USA Program QA/QC Subsidy	$ 950
Total	$13,085.63

Remaining Funds Needed	**$304.37**

6.0 Project Disciplines

Water Supply
_X__ Source Development
_X__ Water Storage
____ Water Distribution
____ Water Treatment
____ Water Pump

Sanitation
____ Latrine
____ Gray Water System
____ Black Water System

Structures
____ Bridge
____ Building

Civil Works
____ Roads
____ Drainage
____ Dams

Energy
____ Fuel
____ Electricity

Agriculture
____ Irrigation Pump
____ Irrigation Line
____ Water Storage
____ Soil Improvement
____ Fish Farm
____ Crop Processing Equipment

Information Systems
____ Computer Service

7.0 Professional Mentor Resumes

The REIC for this project is Jeffery Randall. Joining the travel team as a Professional Mentor this year is Jaynie Whinnery. Ms. Whinnery traveled to Lela with EWB-OSU in 2011 as the student Project Lead. Both Dr. Randall and Ms. Whinnery's resumes appear in Appendix A.

Pre-Monitoring & Evaluation (M&E) Report Part 2 – Technical Information

1.0 EXECUTIVE SUMMARY

The Engineers Without Borders Oregon State University (EWB-OSU) Student Chapter is requesting approval to travel to Lela, Kenya from July 3 to August 1, 2014 in order to conduct a monitoring and evaluation trip regarding the Lela Community Water Project (EWB-USA Project #5091). The project's primary purpose is to provide a sustainable and dependable water source for domestic use in Lela.

The proposed trip will be the first monitoring and evaluation trip for the project. To date, representatives of EWB-OSU have traveled to Lela for two assessment trips and two implementation trips. As a result, the Lela community has increased access to drinking water via two wells and one rainwater catchment system. The purpose of the proposed monitoring and evaluation trip is to assess whether the implemented systems are functioning as they were intended, and how they have affected the community's access to potable water.

The primary audience for this evaluation is EWB-OSU. The chapter will use the results to help decide whether or not to close out the program. Alternatives to closing out would be continuing the water project by implementing additional wells, or starting a new project within the program. EWB-OSU has decided that taking a step back to evaluate the program at this stage will provide a valuable learning opportunity and ensure an informed decision.

The Lela, Kenya program was adopted by EWB-OSU in 2009. There have been no other projects within the program besides the Lela Community Water Project. Assessment trips were carried out in 2009 and 2011. During the first implementation trip in 2012, one well (named Lela A) was drilled, and a rainwater catchment system was installed at the Lela Primary School. A second well (named Lela B) was drilled in 2013.

The major task to be performed during this trip is a selection of household surveys regarding well usage, public health, and related aspects of sanitation. EWB-OSU has prepared a list of questions relating to a baseline survey conducted in 2009 as a means of detecting change within the community. In order to obtain a statistically viable sample size, EWB-OSU plans to survey 60 households. This task is anticipated to be very time-consuming. Other monitoring and evaluation tasks to be carried out during this trip include: water quality testing at each access point, semi-structured interviews with the Lela Primary School teachers, focus groups with the Lela Women's Water Committee, physical system inspection, and head counts to assess the number of daily users of each well.

2.0 PROJECTS TO BE MONITORED AND/OR EVALUATED

Project Type	Project Discipline(s)	Date of Completion (m/d/y)
Water Supply	Source Development	7/9/12, 7/5/13
Water Supply	Water Storage	7/9/12

3.0 SCOPE AND SCALE OF EVALUATION

3.1 Primary Purpose

The purpose of this evaluation is to assess the success and future of EWB-OSU's involvement in Lela, Kenya. This assessment will be done primarily through household surveys and semi-structured interviews to evaluate the community's usage of the wells and rainwater-catchment system. The travel team aims to collect survey data that can be systematically compared to survey results from 2009 and thus detect and evaluate any changes that have occurred in the community as a result of EWB-OSU's partnership. There will be emphasis on understanding which members of the community currently live within 500-meters of the wells and which members are at a disadvantage due to location. Data will also be collected regarding the safety of the drinking water provided by the implemented systems. These water quality results will be compared to the data collected on previous trips. Conclusions from the monitoring and evaluation trip will be used to make key decisions about EWB-OSU's future involvement with the Lela community. Related to this aim, factors that need to be understood include community-demonstrated transfer of knowledge, leadership, and funding.

3.2 Primary Audience

Because the results of the evaluation will be used to demonstrate the effectiveness and impact of the previous implementations, the primary audience for this study is EWB-OSU. The data will guide the chapter's decisions going forward regarding both whether to close out the program or to implement more wells, and how to proceed effectively on any future programs in similar situations. In the case that the chapter decides to close out the Lela program, the data will be useful to members of the EWB-OSU chapter for preparing close out documents and assessing the program's impact. EWB-USA is a secondary audience in that it will receive reports synthesizing the data and provide feedback to the OSU chapter. The community of Lela will also benefit from the evaluation by being able to see documented changes in their community over the past five years, and by receiving feedback from EWB-OSU regarding their management of the project.

3.3 Evaluation Scope

The scope of the evaluation encompasses the entire Lela Community Water Project, which includes two existing wells and a rainwater catchment system, and will focus on three main aspects. First, it will focus on determining the amount of water that is currently being used by the community and from where that water is being collected. Second, information will be gathered to gain insights into the effectiveness of and satisfaction with the water systems. Third, the team will focus on sustainability as a key part of this evaluation. For sustainability, the team will consider financial stability, community support, and the physical condition of the water systems. These data will be used to evaluate the longevity of the water supply and the need for future chapter involvement in the community. The information gathered through this monitoring trip will be used to compare the current situation in Lela to data from surveys and water quality tests obtained during previous assessment and implementation trips.

3.4 Evaluation Scale

Surveys will be conducted over a period of three weeks with a goal of visiting 60 households. Each survey is expected to take 30 to 60 minutes. Selected households will be varied in location to gather information from those within a 500-meter radius from each of the Lela A and Lela B wells and from those outside of these service areas. Teachers at Lela Primary School will be engaged in semi-structured interviews to evaluate student use and reception of the rainwater catchment system. Laboratory and field testing will be performed on water samples from both of the wells and the rainwater catchment system to assess the safety of the drinking water. Community leadership will be evaluated to understand whether knowledge is being transferred by attending weekly meetings with the Lela Women's Water Committee and by observation.

4.0 EVALUATION FRAMEWORK

4.1 Evaluation Focus

The focus is to conduct an impact evaluation to demonstrate how the water systems, education, and training have influenced the community's access to and use of clean water. Specifically, changes in community member's health and accessibility to water will be evaluated. Additionally, the evaluation seeks to discover how EWB-OSU has contributed to any changes observed, and the ability of the community to sustainably maintain the water systems. The following questions will be explored: (1) What has changed in the community? (2) For whom have these changes occurred? (3) How significant are these changes to different stakeholders? (4) To what extent are these changes long-lasting? and (5) How has EWB-OSU's program and project work contributed to the observed changes?

4.2 Key Questions

The key questions to be addressed are as follows:

- How have the implemented systems affected the health of community members?
- How satisfied are community members with the implemented systems?
- Are the implemented systems functioning properly? What are common issues?
- What evidence exists to show whether maintenance is being done by the community?
- Is the fee collection system generating enough funds to ensure sustainability?
- How has the location of the implemented wells affected community dynamics?

To address questions about the wells, the key informants will be community members. They will be able to provide information about how they use the wells, or if they are not using them, list reasons why they are not. Also, the community members will be able to answer questions about their general health and the health of their family members. In order to gather more representative information, the sample of households surveyed will be stratified to include all areas within Lela. The key informants for the rainwater catchment system will be the teachers at the Lela Primary School. The teachers will be able to answer questions about how the system is managed on a daily basis, and how the students use it. Other, observable answers to key questions will be noted by EWB-OSU.

Specifically:

Question	Key Informant	Suitability of Informant	Impact of Outcomes
What percentage of community members are satisfied with the implementations?	Community members, Lela Primary School teachers	Primary users, therefore most suited to answer question	If low, then procedures need fixing; if high, progress is on track
What is the quantity of water available to the community members in dry season and wet season?	Community members, Lela Primary School teachers	Primary users, therefore most suited to answer question	If community members have year-round access to water, indicates improvement
Is the water safe to drink according to KEBS and WHO standards?	EWB-OSU	EWB-OSU will collect water samples and analyze for contaminants	Unsafe water requires action to make it safe
What percentage of households are within 500m of an improved water source (i.e., a well)?	EWB-OSU	EWB-OSU will measure using Google Earth and direct observation	Distance over 500m indicates not all households have reasonable access to water

What is the rate of flow at each water point?	EWB-OSU	EWB-OSU will directly measure with bucket and stopwatch	WHO recommends a flow rate of at least 7.5 lpm at each access point
How clean are the water storage tanks?	EWB-OSU	EWB-OSU will visually inspect tanks	Absence of mildew, bacteria, and debris will help determine community's transfer of knowledge and ownership
What is the cost of water per month for each user?	Lela Women's Water Committee	LWWC maintains records of payments made towards well usage	Will help determine community's financial stability in maintaining water systems
What funds have been utilized and are saved for maintenance of the systems?	Lela Women's Water Committee, Lela Primary School Board	Both groups have access to respective accounts	Will help determine community's financial stability in maintaining the water systems
Is there observable evidence of satisfactory maintenance of the systems beyond work done by EWB-OSU?	EWB-OSU	EWB-OSU has documentation of system construction and repair histories	Will help demonstrate community's transfer of knowledge and commitment to water systems

4.3 Methods of Data Collection

Data will be collected through household surveys, semi-structured interviews with the Lela Primary School teachers, focus groups with the Lela Women's Water Committee, physical system inspection, head counts of water system users, and water laboratory testing. These methods are explained below:

A combination of surveys, semi-structured interviews and focus groups will be used to evaluate health impacts, system usage, and user satisfaction of the implemented systems. The surveys will be conducted with a representative population of the community with regard to usage of the wells. The survey questions to be asked can be found in Appendix B. A majority of these questions originate from baseline surveys conducted in 2009; therefore, responses collected during the 2014 trip can be easily compared to the baseline data. This combination of data will allow a difference-in-difference assessment and regression analysis to evaluate impacts. Open-ended questions will also be asked to provide qualitative context for the quantitative analysis. Semi-structured interviews will be conducted with the Lela Primary School teachers with regards to rainwater catchment system operation and maintenance. Focus groups will be conducted with the Lela Women's Water Committee with regard to the two wells' operation and maintenance. In the latter two instances, conversation will be guided based on in-country observations and discussion.

Physical system inspection will be used to evaluate system condition, operation and maintenance. Key components to the wells and rainwater catchment systems will be photographed and logged for chapter historical records. Any issue related to system status, (e.g. rainwater catchment system showing signs of wear due to children playing on pipes) will be discussed and resolved with the system's governing body.

Head counts will be performed at the Lela A and Lela B sites to quantitatively assess typical daily well usage. Two days of head counts will be performed per site and averaged to estimate user population.

Water samples will be collected from both wells and the rainwater catchment system and sent to the Catholic Diocese of Nakuru (CDN) water quality laboratory. Tested parameters will include a standard panel of pH, turbidity, alkalinity, hardness, total dissolved solids, calcium, iron, magnesium, phosphorous, chloride, chlorine, nitrate and nitrite, fluoride, manganese, and arsenic. Values obtained from this analysis will be checked against the Kenya Bureau of Standards (KEBS) and World Health Organization (WHO) standards for water quality. Field-testing for coliform enumeration will be conducted using Coliscan Easygel, a water testing kit. Particular attention will be paid to the testing of the RWC system storage tanks. During the July 2013 implementation trip, Tank 4 (see Figure 4.3.1 for naming scheme) returned a positive test result for E. coli presence. Since this positive test result, the school board claims to be regularly disinfecting the tank water with Aquaguard, a local diluted bleach treatment. Follow-up testing will confirm if this approach has mitigated the problem.

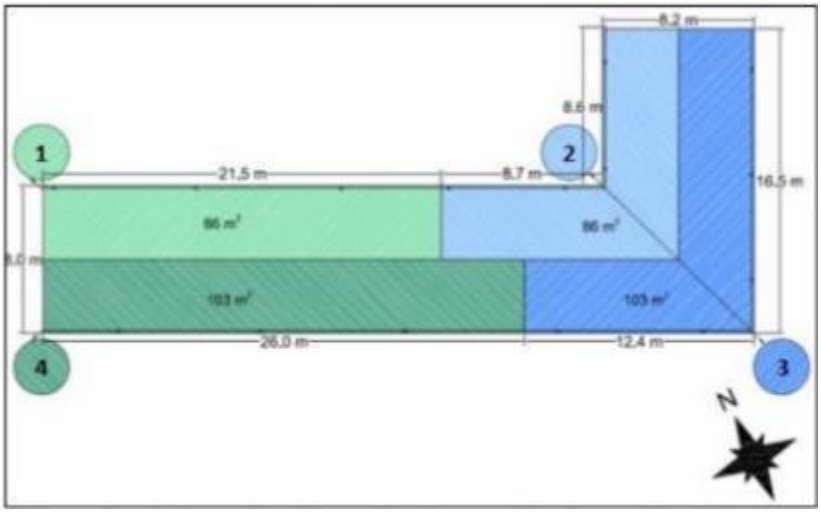

Figure 4.3.1: Rainwater catchment system naming scheme

5.0 ROLES AND RESPONSIBILITIES

Task (listed chronologically)	Person(s) responsible	Anticipated date of completion	Complete?
Complete Document 530	Report authors	May 17	
Update EWB-OSU biweekly	Martha McAlister, Katherine Lanfri	July 3-31	
Contact Ministries to organize workshops	Travel Team	July 5	
Organize meetings with LWWC	Travel Team	July 5	
Collect water samples for water quality testing	Travel Team	July 7	
Observe Lela A to count number of users	Travel Team	July 10, 18	
Observe Lela B to count number of users	Travel Team	July 11, 17	
Conduct interviews with Lela Primary School teachers	Travel Team	July 15	
Address 901B questions with LWWC	Travel Team	July 21	
Complete 60 household surveys	Travel Team	July 26	
Complete Document 531	Travel Team	Sept. 14	
Complete post-trip summary for chapter	Travel Team	Sept. 30	

6.0 ASSUMPTIONS AND RISKS

Assumptions:

There are four important assumptions underlying this evaluation and monitoring trip: (1) survey questions will be answered by a sufficient number of community members to provide a large enough data set, (2) survey questions will be answered honestly, therefore providing meaningful and accurate results, (3) data collected at the beginning of the program will be in a compatible format with data collected this summer to provide useful comparisons, and (4) physical system inspection and other data collected will provide sufficient data to predict the likelihood of future sustainability for the systems.

To address assumption (1), a large enough sample of household surveys will be done to anticipate statistically significant results. For assumption (2) survey questions will be worded carefully so that questions do not influence answers in a certain direction. For example, in certain questions a certain behavior is more socially acceptable and therefore respondents might be more likely to say they do the socially acceptable thing whether that is true or not. Most of the questions that could be answered dishonestly regard behavior that affects sanitation, such as cleanliness. To ensure answers are honest, surveyors will do their best to obtain physical evidence of behaviors; for example when asking how water is stored the surveyors will physically look to confirm the response whenever possible. For assumption (3) the questions are worded so that they are compatible with the baseline data. Addressing assumption (4), physical inspection might

not provide a sufficient understanding of how the system health is progressing over time. For this reason data will be compared to previous system inspection data to determine what has stayed constant and what has changed to build evidence for or against predicted future sustainability for the water systems.

Risks:

The greatest concern is obtaining biased or inaccurate data while conducting surveys. There are two main risks associated with the survey questions: (1) the language barrier and (2) willingness to answer questions. The translator may have difficulty translating the exact meaning of the questions and the exact meaning of participant answers. In this case the team may collect inaccurate data because translated answers may not reflect the intended thought of the survey subjects. All questions will be thoroughly reviewed with the translator prior to conducting any surveys to alleviate this concern; feedback will be obtained from the translator and the wording of certain questions will be modified as necessary to ensure accurate translation. The EWB-OSU team will use the same experienced local guide/translator used for all previous trips to minimize potential problems. The other main risk involved in surveys is the willingness of participants to answer the questions, especially personal ones about their health. Those who are not willing to take the survey may remove a whole section of the population pool and bias the data. Also, the data could end up with missing observations or inconsistencies due to the absence of certain answers. In order to minimize bias that could arise due to unwilling participants, sufficient surveys will be conducted to account for the likelihood that not all questions will be answered by all participants.

7.0 SCHEDULE OF TASKS

A detailed schedule is provided below in Figure 7.0.1. The first week in Lela will be dedicated to adjusting to the community, having an initial meeting with the Lela Women's Water Committee (LWWC), organizing Ministry workshops, sampling water for water quality analysis, observing activity at the wells, and beginning household surveys. By the end of the second week, 40 household surveys, teacher interviews, and a second observation of activity at the well should be completed, in addition to a second meeting with the LWWC. Week three will be devoted to completing the remaining of the 60 household surveys, resampling water if results are concerning, and a final meeting with the LWWC during which questions from Document 901B will be addressed.

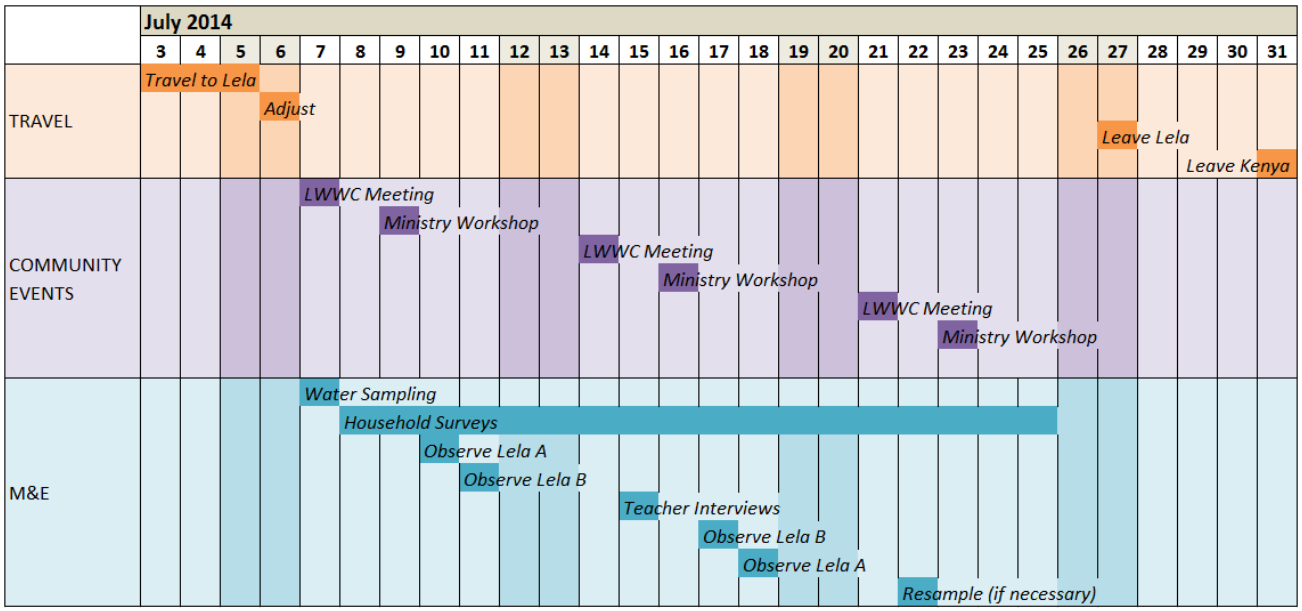

Figure 7.0.1: Schedule of tasks

8.0 PROFESSIONAL MENTOR ASSESSMENT

8.1 Professional Mentor Name and Role

Jeffery Randall, Responsible Engineer in Charge (REIC)
Jaynie Whinnery, Traveling Mentor

8.2 Professional Mentor Assessment

Jeffery Randall's Mentor Assessment:
As the Professional and Traveling Mentor on the last two water supply implementation projects I fully understand the project and have a significant appreciation for the Lela Community. Based on my direct observation of the use and operation by the community of the existing systems, I fully agree that a monitoring trip to support an overall project re-evaluation by EWB-OSU is needed at this time.

Jaynie Whinnery's Mentor Assessment:
This report has come together over the last several months as the team has been preparing for the upcoming monitoring trip. I have provided support as needed, particularly regarding the evaluation methods and survey instruments to be used. Based on my knowledge of the progression of this project, I think that the team's plan to do a monitoring trip at this point is a wise decision. Now that two assessments and two implementations have been completed, it is a good time to evaluate the impact of the work that has been done. This monitoring trip will also provide additional time and information for the team to reassess the future of the project before deciding to close out or move forward with another implementation. At this point the team is definitely on track to being fully prepared to travel to Lela in July for the monitoring trip.

8.3 Professional Mentor Affirmation

Jeffery Randall's Mentor Affirmation:
I acknowledge my involvement in the development of this monitoring trip plan and accept responsibility for the course that the project is taking.

Jaynie Whinnery's Mentor Affirmation:
I acknowledge my involvement in the development of this monitoring trip plan and accept responsibility for the course that the project is taking.

Pre-Monitoring & Evaluation (M&E) Report Appendix A
- Professional Mentor Resumes

Jeffery H. Randall
Principal Groundwater Hydrologist

Education
Ph.D., Hydrology, University of Arizona, 1983
M.S., Hydrology, University of Arizona, 1974
B.S., Geology, Indiana University, 1971

Professional Registrations
Registered/Certified/Licensed Geologist: Indiana (1980, #IN160), Oregon (1982, G855), Idaho (1984, #PGL-559), and Washington (2001, #101)
Licensed Hydrogeologist: Washington (2001, #101)

Distinguishing Qualifications
- Over 40 years of teaching, research, and consulting experience in groundwater hydrology
- Diverse breadth and depth of project work in the U.S. and overseas including hazardous waste, solid waste, water resources, and water supply
- Considerable regulatory expertise involving CERCLA, RCRA, and Washington State MTCA, MFS, and water rights
- Appointed member of the Washington Department of Ecology Well Drilling Technical Advisory Group charged with revising and maintaining regulations governing water and monitoring well construction and driller licensing (1995-2000)
- Appointed member of the Washington Geologist Technical Advisory Committee charged with developing regulations governing the licensing of geologists and geologist specialties (2000-2001)
- Twice appointed member of the Washington Geologist Licensing Board (total board term 2001-2009) and elected Chair (2001-2002 and 2007-2009)
- Executive Committee member of the National Association of State Boards of Geology charged with developing and reviewing the national geologist licensing examination (2008 to 2011)
- Advisor/mentor to the Oregon State University Chapter of Engineers Without Borders

Relevant Experience
After joining CH2M HILL in 1978, Dr. Randall was responsible for numerous projects for federal, municipal, agricultural, industrial, and mining clients. Projects have included: hazardous and solid waste site characterizations, remedial action feasibility studies, and remedial designs; geochemical and flow modeling studies; groundwater monitoring system designs; groundwater resource evaluations; production and dewatering well and well field designs; wellhead protection studies; artificial recharge studies and designs; and environmental impact assessments.

Hazardous Waste Facility Permitting and Remedial Action

Dr. Randall has considerable experience in hazardous waste facility permitting and remedial actions. He was the Geohydrology Quality Assurance Coordinator for CH2M HILL's Zone II REM/FIT Superfund contract and developed the USEPA's Soil Cleanup Evaluation Model (SOCEM) to rapidly determine soil contaminant cleanup levels for initial screening of alternatives. He held roles as project manager or senior hydrologist on 11 CERCLA Superfund, two DOD/IRP, three RCRA, and 10 general hazardous waste projects. In addition, he was the senior reviewer or senior consultant on over 40 other CERCLA, RCRA, and general hazardous waste projects throughout the United States.

CERCLA Superfund projects included Western Processing, Kent, Washington (RI/FS); South Tacoma Channel–Time Oil, Tacoma, Washington (IRM and RI/FS); Wyckoff, Bainbridge Island, Washington (RI/FS); Quendall Terminal, Renton, Washington (RI/FS); United Chrome, Corvallis, Oregon (FS and RD/RA); North Landfill, Spokane, Washington (RI/FS and RD/RA); and Teledyne Wah Chang, Albany, Oregon (RI/FS and RD/RA).

RCRA projects include EnviroSafe of Idaho (RFA/Part B permit); Pendleton Woolen Mills, Camus, Washington (RFI/CMS); Reichhold Chemical, Tacoma, Washington (RFI/CMS and CAD) and Boeing Plant 2 RCRA Corrective Action. Other typical hazardous waste clients include Okanogan PUD, Washington; ARCO, Cherry Point, Washington; Union Pacific, La Grande, Oregon; UNOCAL, Kenai, Alaska; USAF, Shemya and King Salmon, Alaska (DOD/IRP); Reynolds Metals, Troutdale, Oregon; AlliedSignal/Honeywell, Redmond, Washington, and Phoenix, Arizona; and Chevron Port Arthur Refinery, Texas.

Solid Waste

Dr. Randall's solid waste experience includes siting, permitting, and hydrogeologic baseline-design studies; design of saturated and unsaturated zone monitoring systems; groundwater flow and quality assessments of operating and closed landfills to define the nature and extent of existing problems; and preparation of remedial action and closure plans. Dr. Randall has participated in landfill siting studies for the City of Portland, Oregon, and Clark County, Washington. He conducted baseline studies of three potential landfill sites for the City of Portland, Oregon. He has conducted hydrogeologic and water quality assessments of five northwest landfills (St. Johns and Rossman's landfills in the Portland, Oregon, area; the 53rd Street landfill in Albany, Oregon; and the North and South landfills in Spokane, Washington) and prepared remedial action plans for the two Spokane landfills. Dr. Randall was project manager and senior hydrologist on four Kitsap County, Washington landfill projects: the Bainbridge Island Landfill RI/FS and RD/RA project; the Landfill Litigation Support project; the Olalla Landfill MFS Monitoring project; and Hansville Landfill MFS Monitoring and Gas Extraction Operation and Maintenance project. He was also the senior hydrologist and groundwater task leader on the King County Vashon Landfill Monitoring and Expansion project and the senior consulting hydrologist on the King County Cedar Hills Landfill Area 4/5 Expansion project.

Groundwater Resource Evaluation and Development

Dr. Randall has extensive experience in groundwater resource evaluation and development, including well and well screen design, specifications, testing and analysis, and rehabilitation. He has developed water supplies for municipal and industrial clients in glacial outwash, alluvial, and basalt aquifers using natural pack, gravel pack, and open rock hole well designs. Yields have ranged from 100 to 10,000 gallons per minute, diameters from 8 to 30 inches, and depths from 75 to 1,500 feet. Municipal experience includes well field developments for Rockwood and Parkrose Water Districts, the Springfield Utility Board, and the cities of Umatilla, Corvallis, and Lincoln City in Oregon; the cities of Quincy, Wenatchee, and Seattle, Washington; and Wasilla, Alaska. International municipal experience includes exploration, design and construction of a well field in Sri Lanka for USAID. Dr. Randall's industrial and hatchery experience includes well field developments for US Gypsum and Anadromous, Inc., in Oregon; Chelan County PUD, Crown Zellerbach, Greater Wenatchee Irrigation District, Tulalip Tribes, Grant County PUD, and BPA in Washington; and ADF&G Elmendorf and Ruth Burnett hatcheries in Alaska. He is also one of the leading experts in the field of artificial recharge in the northwest United States. He was the project manager for design and construction of a 10-mgd aquifer storage and recovery (ASR) system for the Seattle Water Department and senior consultant on ASR feasibility studies for the cities of Tacoma and Walla Walla.

JAYNIE WHINNERY
Worldwide Availability in August 2014

Policy Analyst with an engineering background
One year of experience living and working in developing countries in Southeast Asia (Cambodia), East Africa (Kenya), and Central America (El Salvador)
Expertise in monitoring and evaluation for development programs
Advanced quantitative and qualitative research skills
Four years of Fortune 500 global product development experience

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EDUCATION

M.P.P	International Policy track, Oregon State University, 2014 exp., GPA 3.92
M.S.	Environmental Engineering, Oregon State University, 2012, GPA 3.74
B.S.	Mechanical Engineering, Oregon State University, 2007

SKILLS

Languages	Cambodian and Spanish (Intermediate), French and Mandarin (Novice)
Data Collection	Experience with survey design, sampling methods, conduct of interviews, visual, audio and video observation records and ethics review boards
Analysis Methods	Knowledgeable about conducting program evaluations using randomized controlled trials and mixed methods research approaches - *Quantitative: econometrics and advanced social research methods* - *Qualitative: content analysis and emergent thematic coding*
Computer Programs	Microsoft Word, Excel, PowerPoint, Visio, Project, Outlook, SharePoint Analysis Packages: SPSS, Stata, ATLAS.ti Engineering: experience with GPS/GIS, MATLAB, CAD/CAM/FEA

AWARDS

2014	OUS Chancellor's Award for International Study (OUS Cuba Program)
2012-2013	Boren Fellowship for International Study *Khmer Language Study and Evaluation of Biosand Water Filter Sustainability in Cambodia*
2011-2012	Susan E. Stutz-McDonald Memorial Fellowship Scholarship
2011-2012	Oregon Lottery Scholarship
2010-2012	Intel Scholar
2007	Outstanding Undergraduate Service Award, OSU MIME
2007	Outstanding Student Officer Award, SAE International

PROFESSIONAL EXPERIENCE

2014	Professional Mentor, Lela Community Water Project, Engineers Without Borders, Oregon State University (Kenya)
2013-2014	Teaching Assistant, Sociology Methods I (Research Design) and II (Quantitative Analysis), Oregon State University, School of Public Policy - *Instructed undergraduate students in the use of SPSS software* - *Advised and mentored students regarding course concepts and tasks*
2012-2014	Research Assistant, Engineering Education Research Group, Oregon State University, School of Chemical, Biological, and Environmental Engineering - *Led the qualitative analysis of data from six years of student cohorts*

engaged in an industrially-situated, open-ended Virtual Bioreactor Laboratory Project funded by the National Science Foundation (NSF)
- Assisted in two cycles of ethnographic data collection for the project

2013 Boren Fellow, Technical Advisor for Biosand Water Filter Evaluation and Water Quality Laboratory Operations, Water for Cambodia (Cambodia)
- Managed household survey design, execution, analysis and reporting
- Led the implementation of digital application-based survey techniques
- Streamlined water quality laboratory management and operations

2013 Boren Fellow, Intern for Comprehensive Program Evaluation including Biosand Water Filters, Water Wells, Village Fund Microfinance, and Envirofit Cook Stoves, The Trailblazer Foundation (Cambodia)
- Managed household survey design, execution, analysis and reporting
- Implemented a system of more efficient monitoring methods and more effective evaluation metrics for a microfinance program

2012 Research Assistant, Master of Public Policy Program Evaluation, Oregon State University, School of Public Policy

2012 Research Assistant, Coastal Community Adaptive Capacity NSF Research Proposal, Oregon State University, School of Public Policy

2011 Research Assistant, Service-based and Experiential Learning Literature Review, Oregon State University, School of Public Policy

2011 Volunteer for Biosand Water Filters, Water Wells, and Agriculture Programs, The Trailblazer Foundation (Cambodia)

2011 Teaching Assistant, Sustainable Water Resources, Oregon State University, School of Chemical, Biological, and Environmental Engineering

2011 Teaching Assistant, Energy Balances, Oregon State University, School of Chemical, Biological, and Environmental Engineering

2011 Travel Team Lead, Lela Community Water Project Technical Water Source Assessment, Engineers Without Borders Oregon State University (Kenya)
- Coordinated travel logistics including transport of testing equipment
- Managed rural water quality and indoor air pollution testing

2011-2012 Project Coordinator, Lela Community Water Project in Kenya, Engineers Without Borders Oregon State University (USA)
- Managed relations with the Lela community, partner NGOs and public and private sector partners (local and international)
- Managed project budgets, program plans and future vision of projects
- Coordinated groups to write grant proposals and program reports
- Several final reports submitted to EWB-USA (parent organization) became example reports for other chapters to reference

2010-2011 Teaching Assistant, Transport Phenomena, Oregon State University, School of Chemical, Biological, and Environmental Engineering

2009-2010 Board Member, Corvallis Young Professionals Network
- Planned professional networking events
- Coordinated with local businesses, non-profits and government offices

2008 Professional Mentor, El Salvador Water Project, Engineers Without Borders, Oregon State University (El Salvador)
- Mentored students through the design and implementation of rainwater catchment systems, ceramic water filtration units and wash stations
- Managed project budget

2007-2011 National Technical Inspector, Baja SAE Collegiate Design Series, The

Society of Automotive Engineers (SAE) Foundation (USA-based events)
- Ensured that student designed and constructed vehicles were in compliance with the required technical and safety specifications
- Evaluated budget analyses and design reports

2007-2010 Mechanical Engineer for Thermal Inkjet Printing R&D and DARPA Very-High Efficiency Solar Cell (VHESC) program, Hewlett-Packard (Oregon)
- Product research and development in global collaboration with teams in Europe (Ireland, Spain) and Asia (Singapore, Malaysia, China)
- Frequently presented work and findings in meetings at various levels
- Managed testing equipment that required extensive collaboration with managers, developers, technicians and operators in the USA and India
- Led an integration sub-team to implement a novel ink-level sensor
- Designed a testing unit and conducted thermal performance analysis for the DARPA VHESC program

2006-2010 Various Positions, HP Young Employee Network (YEN), Hewlett-Packard (Oregon)
- Held consecutive Chair and Co-Chair positions on the Corvallis YEN Board of Directors (2007-2009)
- Managed attraction, retention, professional development and employee engagement programs including university recruiting activities, intern mentoring and mentor buddies
- Instrumental in the creation of a global YEN network; Corvallis site representative on the Global YEN Leadership Team (2008-2009)

2005-2007 Engineering Intern for Thermal Inkjet Printing R&D, Hewlett-Packard, (California/Oregon)

2004-2007 Various Positions, Society of Automotive Engineers (SAE), Oregon State University
- Managed corporate sponsor relations and an annual budget of $100,000 as President (2006-2007) and Vice President (2004-2005)
- Led a team of 30 students to design, manufacture and test a Baja SAE vehicle that won first place overall at two international competitions in 2006, which required extensive cost and budget reports, written and oral design reports and an oral marketing presentation

2004-2005 Machinist & Welder, Oregon State University Mechanical Engineering Machine Shop

PATENTS

2009 Fluid-jet precision-dispensing device having one or more holes for passing gaseous bubbles, sludge, and/or contaminants during priming, Hewlett Packard Development Company, WO/2009/145759 (Jaynie Schonbrod)

PUBLICATIONS

Jaynie Whinnery, "The Influence of NGO Strategies on the Sustainability of Biosand Water Filters in Cambodia," 2014 (forthcoming).

Jaynie Whinnery, "A Well Construction Cost-Benefit Analysis (CBA): For Water Supply Well Guidelines for use in Developing Countries," *Water Well Journal*, March 2013.

Jaynie Whinnery, "Characterization of the Feedback between the Instructor and Student Teams Engaged in a Virtual Bioreactor Laboratory Project," 2012.

Debra Gilbuena, **Jaynie Whinnery (Presenter)**, and Milo Koretsky, "Feedback Techniques for Small Teams Completing Authentic Engineering Tasks," *Research in Engineering Education Symposium*, Putrajaya, Malaysia, July 2013.
Laura Hirshfield, **Jaynie Whinnery**, Debra Gilbuena, Audrey Champagne, and Milo Koretsky, "A Study of Feedback Provided to Student Teams Engaged in Open-Ended Projects," *American Society of Engineering Education Annual Conference*, Indianapolis, USA, June 2014.

TRAINING & CERTIFICATIONS

2012	Neighbor-to-Neighbor Basic Mediation Training through the Mediators Beyond Borders chapter at Oregon State University *32 hours of training and practice using facilitative mediation techniques to resolve community conflict scenarios*
2012	Wilderness Living Techniques and Survival Training
2011	SOLO Wilderness First Aid
2011	American Red Cross First Aid with CPR/AED

RELEVANT GRADUATE-LEVEL COURSEWORK

Social Science Economic Development
Public Policy Theory
Public Administration
Public Policy Analysis
Econometrics
Social Research Methods
Conducting Social Research
Applied Research Methods
International Policy
Democratization
Anthropology of International Development
Cuban Society, Culture and Politics through Film
Socio-technical Aspects of Water Resources
Engineering Sustainable Water Resources Development
Water and Wastewater Engineering
Environmental Engineering Design
Microbial Processes in Environmental Systems
Physical & Chemical Processes for Waste Treatment
Aqueous Chemistry

Pre-Monitoring & Evaluation (M&E) Report Appendix B
- Survey Questions

2014 Monitoring & Evaluation Household Survey

Interviewer(s): Date:

Respondent (male, female, other comments): Household Code (GPS):

1. **Number of household members by age & gender (including the respondent)**

Pregnant	5 & under		6-14		15-62		Over 62		Total		
	M	F	M	F	M	F	M	F	M	F	T

2. **Have you received health education or health messages related to water and sanitation (e.g. hand washing, water purification, defecation practices), in the community or at home, in the past year? (from clinic, community health worker, etc)**

____ yes ____no ____don't know/not sure

3. **Where do you get your drinking water?**
(check all that apply)

In house tap		Community tap	
Surface water		Spring water	
Well (A or B?)		Rain water	
Bottled water		Other	

3a. **Do you get your drinking water from this source year round?**

____yes ____no

3b. If no:

i. **What months do you get water from this source?**

ii. What other sources do you use to get your water?

3c. If "Well" was selected:

i. What problems have you encountered with the wells? (A or B?)

ii. On a scale of 1 to 7, how satisfied are you with how the Lela Women's Water Committee operates the wells? (Where 1 is completely dissatisfied and 7 is completely satisfied.)

iii. What ideas do you have for improving the use and management of the wells?

iv. How much money do you spend on water every month?

4. How long does it take you to collect your household water and drinking water each day? (Pick only one.)

< 30 min		0.5 – 1 hour	
1 – 2 hours		2 – 3 hours	
> 3 hours		N/A	

5. Do you do anything to purify your water before you drink it?

____ yes ____no ____don't know/not sure

5a. If yes:

i. What method do you use?

Filter		Boil water	
Chlorine/other chemical		Solar disinfection	
Other:			

ii. Why do you use this method?

Cost		Taste of water	
Ease of use		Health/safety	
Don't know/not sure		Other:	

6. Show me the container where you store your water at home.

____covered ____uncovered ____prefer not to answer

6a. Do you clean your water container?

____yes ____no

(observe: ____looks clean ____light mildew ____heavy mildew)

6b. Show me what you use to clean the container.

____soap ____no soap

7. Show me what you use to dip the water out of its container.

____designated for clean water ____multipurpose dipping device

7a. Do you clean the dipping device? How?

____yes ____no

(observe: ____looks clean ____light mildew ____heavy mildew)

8. Show me where you wash your hands.

____soap ____no soap

9. In the past 2 weeks has your child <5 had diarrhea?

____ yes ____no ____don't know/not sure

9a. If yes: **How often have they had diarrhea?**

Daily		4 – 7 times	
12 – 14 times		1 – 3 times	
8 – 11 times		N/A	

10. In the past 2 weeks have you had diarrhea? *(Gauge if it is appropriate to ask)*

____ yes ____no ____don't know/not sure

10a. If yes: **How often have you had diarrhea?**

Daily		4 – 7 times	
12 – 14 times		1 – 3 times	
8 – 11 times		N/A	

11. Do you use a latrine?

____ yes ____no

11a. If yes, can I see it?

____nearby ____far away

12. In the past month have your children experienced any of the following?

Difficult breathing		Fever	
Convulsions		Diarrhea	
Bloody stool		Cough	
Malaria		Other	