**Weekly Status Report – Niles Guo Oct 29, 2017**

**This week’s activity:**

1. Went through the MML exercise with Tim and filled out the MML1 and 2 sections of the rubric. I will walk through this with Jay this week.
2. Incorporating the feedback from you and Jay on the paper outline. I plan to have a new draft tomorrow uploaded onto Asana.
3. Read both of Linling’s paper with Ignacio on her optimization models.

**MML1/2 Rubric:**

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| --- | --- | --- |
| Level | Activities | Output |
| MML1 | - Problem statement  - System boundary defined  - Input/output parameters defined  - Key system constraints defined | Problem statement: Overall objective is to design a cost effective (in terms of financial cost, human health impact cost, and freshwater cost) wastewater management system for shell gas production in the Marcellus region.  System boundary:  - Gas production and gas revenue (through drilling and production schedules) are treated as constants and not modeled explicitly.  - Only air emission is used to model human health/environmental impact. Water contamination, noise pollution, or other community impacts are not modeled here.  - Both onsite and centralized water treatment options are considered.  - Water disposal is included in the analysis.  - Water transport, in terms of both volume and options, are modeled.  - Different onsite water storage options are modeled.  - Only considering the 14 well-pads with the 98 wells studied by Bartholomew and Mauter in the Marcellus play.  Global Parameters:  - Fracking schedule  - Case study setup (locations of well-pads, centralized treatment facility, storage options, freshwater sources etc.)  - Available waste water treatment technologies and their specifications  - Marginal human health impact parameters associated with each activity.  - Freshwater demand  - Waste water production  - Transportation layout and options  Key Input Parameters:  - Selection of freshwater source  - Selection and sizing of water storage  - Variable cost parameters  - Selection of waste water treatment options  - Selection of transportation options  - Amount of reuse of waste water  - Objective weighting  Key Output Parameters:  - Water management financial cost  - Human health impact cost  Key Constraints:  - Mass balance constraints (water volume)  - Regulatory constraints (water disposal option? Water reuse?)  - Operator constraints (quality of water for reuse?)  - Transportation constraints (trucking rates, piping connection, pipe size) |
| MML2 | - Key objective functions defined  - Relevance and viability of the study | Key Objective Functions:  1. For a set fracking schedule and set production schedule, the objective is to minimize waste water financial cost.  2. For a set fracking schedule and set production schedule, the objective is to minimize human health and environment impact cost.  3. For a set fracking schedule and set production schedule, the objective is to minimize the use of freshwater. |

**Issues/Agenda for next meeting**

1. No meeting this week, but I will schedule some time with Jay to walk through the MML 1 and 2 rubric and get his feedback. Once that’s done we can start moving to the MML3 activities and start building out some of the submodules.

**Next week’s activity:**

1. Iterate through the paper outline.
2. Start working on the MML3 activities based on feedback from Jay.