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**Subject:** Lone Pine  
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Alex,

As discussed, below is a draft narrative for Timeline & Process Changes. I got most of the big pieces; there are no events for February, which we spent on planning. This is way more detail than you need for EDO, but I've made it comprehensive for our records. I did not discuss here the change in operators.

For all recipients, please throw in suggestions or revisions as needed.

Let's plan to meet 11am Weds at COGCC offices, to meet your director and with staff to discuss what's next.

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#### Timeline:

- 12/12/11 Lone Pine engages process engineer to help with plant evaluation and reconfiguration.
- 12/20/11 COGCC Inspector Kris Neidel makes a random inspection and sees oil on Pond #5; investigates and finds oil-stained rocks past the outlet weir into Spring Gulch.
- 12/23/11 Lone Pine receives the COGCC report via mail; Lone Pine immediately investigates with trained environmental technician, who checks downstream at 3 culverts: Spring Gulch at first field road to #16 (at +1,250ft from weir) had minor sign of oil stain on vegetation; main road into field on Spring Gulch (+4,550ft), same minor stains; Delaney Butte Reservoir road (+14,650ft from weir) no sign of oil at all; takes pictures. Spring Gulch and Hell Creek are completely bridged over with snow, so there is no practical way to investigate the extent of the spill; from the road crossings it appears to be less than 1 barrel, and certainly under COGCC 5 bbl criteria.
- 1/04/12 Extensive conversations with COGCC inspector and HQ about the details, more investigation and pictures by Lone Pine; no new spillage,

seems to be a one-time limited event; operator's crew picks up oil-stained soil around ponds.

- 1/11/12 Meeting onsite at field with owners and operator of Lone Pine, inspector & manager from COGCC, and representative from CDPHE. Discuss COGCC Field Inspection Report with extensive list of items to address; also cleanup of spill effects when able, plans to evaluate and improve oil-water separation process, and closure of the unlined pit.
- 1/19/12 Lone Pine files Form 19 spill report on December upset.
- 3/07/12 EPA notifies Lone Pine that a neighbor has reported a spill, apparently mentioned in the Jackson County newspaper ca Feb 23 edition. Event will need to be reported to NRCS.
- 3/08/12 Lone Pine files NRCS report 1005125 for December upset.
- 3/20/12 Lone Pine field is entirely shut in, and lines and plant drained down; extensively clean and re-configure the process plant and ponds, diagnose and eliminate several significant problems with process.
- 3/28/12 Contractor hauls oily water off lease in water truck, past the extensive Pit reclamation and oil separating equipment and settling ponds, and apparently intentionally sprays water on a paved road about 1 mile away; neighbor witnesses the discharge.
- 3/29/12 Witness reports spraying of water on road to COGCC, who reports it to Lone Pine for first notification. Lone Pine immediately investigates, finds evidence of spray as reported.
- 3/30/12 COGCC investigates spraying incident, verifies evidence; reviews changes to plant and beginning of compliance with January inspection items.
- 3/31/12 Landowners note oil sheen on Hell Creek, after snow has melted back to uncover the creek.
- 4/1/12 Landowners report seeing oil sheen to Lone Pine operator. Immediately investigates and finds small and isolated pockets of oil-stained dried vegetation above the stream bank.
- 4/02/12 Landowner reports sheen on Hell Creek to COGCC.
- 4/05/12 EPA and COGCC meet onsite with landowner to investigate the extent of the effects of the December spill along Spring Gulch and Hell Creek.
- 4/07/12 Lone Pine crew rakes up oil-stained vegetation along Spring

Gulch.

- 4/11/12 Lone Pine files Form 19 spill report on Jackson County Road (JCR) 12W.
- 4/17/12 Started a few wells, limited basis, filling plant vessels.
- 4/19/12 Process tank overflows during fillup, produced water is fully contained in berm; verbal report same day to COGCC via email.
- 4/25/12 EPA & COGCC meet onsite as followup; snow is completely melted away from creeks, identify more cleanup locations; Lone Pine starts further cleanup that day.
- 4/25/12 Denver Post reports on December spill, big media splash; local 9News (KCNC-TV) picks up Post article on morning broadcast; several updates to newspaper website.

#### Process Narrative by SS:

After the process upset in December, Lone Pine committed to COGCC to evaluate the process plant and make the necessary changes. Before the upset, Lone Pine had already hired a petroleum engineer to evaluate the process (initial contact 12/12/11). After the upset, Lone Pine brought back its tanks & plant construction expert to help with evaluation and do the changes.

The experts planned to change the final produced water tanks to work in series, to add 2 more levels of oil separation before the settling ponds. We hoped to identify 2-3 things that had upset the process for the first time in at least 20 years. We found and corrected several significant things, in process order:

- Large Knockout (KO) was waist high with sludge; working section was only 2-3ft vs 6ft;
- On both large and small KOs the floats were set too high; the oil-water level should be in the vertical center of the tank, with pure oil at the taps 2-3ft above the center; we found oil-water mix all the way up to the oil outlet, allowing too much water into the Treater; the KO floats were re-set;
- The pressure relief valve on the large KO was at the outlet end of the vessel;

any large gas influx would churn up the entire vessel and was slow to vent; the PRV was moved to the inlet end, and a Back Pressure Valve added to better regulate the pressure on the gas section; this setup should handle gas events more quickly and evenly;

- Treater mid-section between bubble trays was full of sludge and was cleaned;
- This Treater section is designed to have excelsior “hay” (fine wood turnings) to coalesce the oil droplets; there was no hay in this section, apparently from a decision made during a previous cleanout; section was stuffed with excelsior as designed;
- Treater should have pure oil above the center “hay” section; the entire vessel was found to be full of oil-water mix, and is not designed to remove that much water; controls were set to the proper oil-water level;
- Treater top relief valve was found to be constantly leaking oil & water, dumping it to the lined Pit; faulty valve was replaced;
- Treater back pressure valve on the water dump line was found to be constantly leaking, and the back pressure regulation was inoperative, allowing pressure to rise too high, exacerbating the leaking PRV problem; valve was replaced and set to a lower pressure;
- PRVs from KOs and Treater had been piped to dump into the lined Pit, which was a continual cleanup challenge with heavy oxidized oil, water and blown-in debris; a 400bbl Pop Tank was installed to capture all fugitive releases and recycle back into the KOs;
- With all the inputs shut off, the Pit is being drained of oil and water through a rented weir tank and separation process; when the liquids are pumped off, the liner will be cleaned and removed for disposal; contaminated soil will be removed and disposed, and the Pit will be closed;
- Produced water tanks #2-3 were found to be running in parallel, and Tank #1 was isolated and unused; any upset in the KO (such as a large gas influx) could carry oil emulsion into the tanks; with parallel piping, there was only 1 step to catch oil before the ponds; with only 2 of 3 tanks operating, the residence time to settle and allow demulsifying chemical to act was shortened by 33% before exiting to the ponds; the tanks were piped in series and Tank #1 was placed in service, to provide 3 levels of oil capture;
- All three 400bbl tanks were modified to the same internal piping: inlets are

about 2/3 toward the top, set at an angle to induce swirling in the tank for better separation; outlets are about 1ft off the bottom in the center of the tank, with a U-tube riser to prevent total drain-down and loss of any surface oil, in case of an upset;

- Produced water tanks #2-3 were found to have 5-7ft of oil on top of the water; this caused the incoming water to pick up and emulsify more oil, and greatly reduced the residence time of the water and chemical, both of which were contributing to oil carryover to the Ponds;
- The tanks have a skimmer system to take the top 1-2ft of liquid off the tops of the tanks, including any oil buildup; the skimmer was reportedly run every week, but the skimmer pump was found to be much too small for the job; the pump was replaced with a much larger pump that can skim the tanks in minutes, not hours;
- The only way to check the progress of the skimmer was with an aluminum ladder to access the thief hatch, which was especially difficult in winter; new stairs and manways were installed to all 3 tanks;
- All vessels and tanks were cleaned and inspected; corrosion pits repaired by welding or covered with fiberglass;
- All retaining Ponds #1-5 were drained as far as practical and oil residue removed from sides and bottoms as found;
- Ponds #2 and #3 inlets were fitted with a fabricated filter box with excelsior to coalesce and collect any incoming oil to reduce the sheen; a similar filter was installed on the outlet weir;