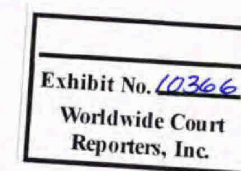


Annotated Index for Notebook -- Temperature Measurements or Attempted Measurements

Event Date	Short Description	Tabs	Notes
4/28	Survey BoP C & K lines	72.02, 74.02	To assess possibility of flow through C and K lines. (T 72.02, tab Chronology, row 19.) Survey found no flow found in C and K lines. (T 72.02, tab Current row 12). (T74.02 is a log noting ROV activity).
4/28-5/3	Riser survey including kink	2, 4, 5, 7, 8, 17	Probe on outside of riser. Three surveys (T 17, attachment): 4/28, 5/2, 5/3. Took 2.5 hrs for first reading; gaps due to limited time (T 2) Anomalies: downstream of kink at 177 on 4/30, upstream of kink at 126 on 5/3. Highest reading = 179 "just dwstrm of the kink" (T 17 attachment). T 7 contains a notation of temperature survey at the riser on 5/4 at C74. Recorded data is in Tab 5.
Prior to 5/2	Flex joint plume survey	10	Email of 5/2 states temp at flex joint was 170F two days prior
5/11	Riser end plume survey	14, 15, 16	Two locations: 9" from end of riser pipe T=40; 18" from end of riser pipe T=64. (T 15) Email (T 16) indicates values were not useful.
6/3	Post-cut BoP exit plume survey	24	According to email from Peter Carragher, temp at plume exiting BoP at TVDSS 5001' was 185F.
6/4	Surface (vessel) measurement + in well pipe	24	Temperature taken at the separator (TVDSS +80 feet): 107 F at Separator; 236F at TVDSS of 18,024 feet.
6/10	Top hat measurement	27, 28, 29, 30	Recommended that sampling be done where the plume was exiting the top hat because those would likely be the "highest, most representative samples." (T 27) Reading obtained was 52 F at the base of the top hat. (T 29) Survey deemed not successful. (T 29)
6/19	Survey choke line to Q4000	31, 32.01-32.05, 32.11-32.15	Temp. survey of choke line to Q4000 by Mill 42. Temperature reading locations (5) shown in Tab 32.10 -- 1 riser to the Q on top of the second lower riser assembly; 2 riser to the Q below the first riser assembly; 3 exit of the choke line from the choke manifold; 4 entrance to the choke manifold; 5 near choke line exit to BOP. Repeated at 1 & 2. Photos at 32.11-32.15
7/12-13	Plume and below BoP/at wellhead before final Capping Stack installation procedure	35, 36, 37, 38, 39, 41, 45	T 41, 45: Plume readings = 106, 102. Wellhead readings = 48, 47. T 35: Max temp in plume = 112, "body below BoP" = 41. Other "wellhead" readings (T 39) = 43.9 to 46.7. (Per T 38, at "wellhead.") Readings called "suspect at best" on 7/12 (T 37)
7/16-8/17	Conductor casing temperature readings	40, 42-44, 46-54, 56, 60-69, 73.01	Basic instructions and photo in T 40. Sensor was held vertically, perpendicular to the casing. T46 explains certain data gaps. Data reported by emails. <u>Data plot in T 73.01.</u> At start: readings every half hour. August 3, readings began to be taken every 15 minutes. Every 6 hours, the probe pulled off of the casing to verify ambient. At other times probe removed from the casing for technical reasons, such as repositioning of the ROV, sensor re-installation, recalibration, sensor damage, and bubble/gas sampling. At those points, gaps in data.



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Miscellaneous Materials

Date	Tab	Notes
4/29	1	4/29 email states "temp evaluation test took place today to indicate hot/cold spots in riser and BOP."
5/1	3	Summary of ROV measurements to date: 60 to 140; on May 1, after new leak at kink found, 160. (P 2, top, in email set)
5/2	71.02	"MC 252 Incident Video Log" refers to MIL 36/37 (BSC) and "temp measurements on BoP." (Tab "Log All," G103)
5/4	6	States temp at wellhead is 120. (P 3 in email set.)
5/4	71.02	"MC 252 Incident Video Log" refers to MIL 42 (O13) and "temp probe measurements on BoP." (Log All tab, G217)
5/4	70.02	Completed Actions tab (D17) refers to O13 completing temp survey at riser
5/8	9	States temp at "BoP leak" is 175 and "oil temp at end of riser" was 86.
5/8	71.02	Refers to "O13 temperature measurements" from 0958 to 1230 (Log All tab, G574-577)
5/10	11, 13	T 11 on P 2 notes plan over next 12 hrs to take temp data at riser entering seafloor, riser coming out of seafloor, and end of riser. T 13 (second attachment to cover email) states that temp readings were obtained at riser entering seafloor.
5/10	11	86 F was not a measurement. 175 F was a reading taken by the Hive.
5/10	13	Plan doc (second attachment to cover email), § 2.3.2., ROV tooling, notes plan to deploy two rental temp probes on Mil 82 (DEN)
5/10	71.02	"MC 252 Incident Video Log" refers to MIL 42 (O13) and "riser temp monitoring." (Log All tab, G905, G909)
5/11	71.02	"MC 252 Incident Video Log" refers to MIL 42 (O13) and "temp monitoring." (Log All tab, G1044)
5/11	70.2	Completed Actions tab (Q43) refers to Riser Temp Survey -- O13 -- "Added via WRF (Obtain Temp at trench plume)"
5/10	12	States temp at BoP is 142. (bottom email in set)
5/15-17	18, 19	"Downhole readings" by "gauge whip" -- no temps measured. Temp columns are populated with zeros.

5/19	20	Estimated temperature at the end of the riser = 50. Flowing wellhead temperature = 108 (bottom of page) was a typo.
5/20	21	Flowing wellhead temperature = 180 (top of P 2)
6/1	22	200 F "working number"
6/3	23	Flowing wellhead temperature = about 175, "design temperature should be 200."
6/4	25	Flex joint subjected to 200 F oil flow. (bottom of P 1)
6/6	70.02	Completed Actions tab (D226) refers to OI3 operation -- "pressure/temperature sensor interrogation at BOP site"
6/9	75	Fluid temp out of BoP after riser cut was approx. 185. At riser end before cut was 105. (Carragher email, middle of P 1)
6/10	26	Top Hat = 200
6/29	33	Emails discussing temperature data -- Gochnour and Smith. Smith notes he advised scientists of issues with temp data on CS
7/10	34	Email (Gochnour) notes request for "temp measurement once the cap comes off."
7/11	70.02	Plume temp measurement postponed for work on transition spool. (Completed Actions Tab, Q448.)
7/16	76	Reports that temp at wellhead is 39.8, which is eight degrees lower than flowing case earlier that same day. (P 2 in email set.)
7/21	49	Temp probe removed from casing at request of U.S. official to determine ability to read ambient.
8/2	59	Mill 37 ROV brought back to the surface due to issues with temperature probe.

Additional Tabs

5/2	78	Deepwater Horizon BOP ROV to PT Probe Intervention Procedures
7/31	77	Operations Manual for Down Hole Pressure – Temperature Modem
8/1-8/28	55.02, 55.04, 57.02, 58	TTB Data
--	79	Brochure for Ultra-High Accuracy and Resolution Handheld Thermistor Thermometer