Report about the BP Alaska Badami No. 5 core (11,261') and BP Alaska Badami No. 4 cores (11,152', 11,155', and 11,196') compatibility test with various drilling fluids.

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Total of 12 pages in report

Alaska Geologic Materials Center Data Report No. 321

Mi SWACO

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BP Coiled Tubing Drilling
Badami Core Sampling
Shale Stability Testing

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Mi Swaco

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BADAMI CORE SAMPLES
BP CTD
11/14/05

Badami cores from the B-03 and B-04 were viewed and inspected at the State of Alaska's Geology storage facility located in Eagle River, Alaska in September 2005. The core quality was as good as could be expected for rocks from depth to surface pressure and atmosphere while being stored for many years. Rocks appeared somewhat "dry" but competent. Some shales stored in this manner may delaminate and crumble over time making this type of study irrelevant.

The cores consisted of a sand shale Turbidite sequence found to the northeast North Slope Geology. The target sands and adjacent shales appeared competent. The sands should not pose a drilling problem therefore sand samples were not taken. Samples from four shales, at depths of 11,152', 11,155', 11,196' and 11,261', were collected for fluid stability studies to determine the type of drilling fluids and shale inhibitors to be economically used in Badami Coiled Tubing Drilling (CTD) drilling operations. These shales may possibly be penetrated during the proposed Badami Coiled Tubing Drilling (CTD) drilling operations scheduled in February 2006. The sample taken at 11,155' is the "target" sample.

The samples were described prior to being placed in various solutions for a period of 5 days. Note that the samples remained in the solutions for a longer period with little to no change visually approximately every week until two weeks ago from this date. Visual inspections and descriptions were recorded in table form. Photographs were taken of each solution suite. A representative sample of each shale was sent to the MI Swaco Lab in Houston for mineralogy and exchange capacity. See attachments included that summarize the results of this exercise.

Each sample was divided into seven portions. Six were placed into the following solutions and the seventh sent to Houston for analysis.

Fresh Water
8 ppb KlaGard in fresh water
10.7 ppg Sodium Formate (Na Formate)
10.7 ppg Potassium Formate (K Formate)
1% UltraHib

10.7 ppg KCl, NaCl, NaBr (3% KCl, NaCl to 9.6 ppg, weighted to 10.7 ppg NaBr).

All samples were returned to the State of Alaska with the exception of the seventh which was disposed of in Houston.

Economic Summary

Information provided:

BADAMI 11/7/05
CTD NORDIC 2
~6400 psi @ 10200' TVD ~12.25 ppg (balanced) ~12.6 ppg with
200 psi over balance KWF (?)
Drilling fluid weight ~10.7 ppg
Under-balanced Drilling

Three FLOPRO SF systems should be acceptable for the Badami over-balanced CTD program. A blend of KCl/NaCl/NaBr or Na/K Formate or K Formate brines are acceptable for the fluid system base fluid. According to the observations, the salt blend of K, Na & NaBr can be used. For additional inhibition KlaGard or UltraHib may be used.

A blend of Na and K Formates, adjusted for acceptable 15 to 20° F crystallization points, would be more economical than a straight K Formate brine with a crystallization point of ~33° F. Usually, all brines are formulated for a 10° F crystallization Point.

There are four 10.7 ppg fluids that could be used to drill this well.

1. KCl/NaCl/NaBr base ~$144 per bbl Freeze pt ~10° F
2. KCOOH base ~$321 per bbl Freeze pt ~ -30°F
3. 5% KCOOH plus NaCOOH ~$235 per bbl Freeze pt ~33°F
4. NaCOOH base ~$188 per bbl Freeze pt ~ °F

BP CTD BADAMI ROCK SAMPLES

Started 11/3/05 Ended 11/7/05

SAMPLE	GENERAL DESCRIPTION	WATER	8 PPB KLAGARD	1% ULTRAHIB	10.7 PPG KCl/NaCl/NaBr BRINE	10.8 PPG Na FORMATE	10.7 PPG K FORMATE
BADAMI #4 11,152' SAMPLE 1	Light brown sitly to fine sandstone thinly interbeded with medium gray silty shale. This rock should not be penetrated.	Slight dispersion with some blocky breakage. No swelling	No dispersion with no breakage. No swelling. Competent sample.	No dispersion with no breakage. No swelling. Competent sample.	No dispersion with no breakage. No swelling. Competent sample.	Very slight dispersion with some minor breakage but otherwise a competent sample.	Very very slight dispersion with some very minor breakage but otherwise a competent sample.
BADAMI #4 11,155' SAMPLE 2	Light gray siltstone with light brown interbedded very fine silty sandstone. Some green cast to color that suggests glauconitic clay. This rock may be kicked off in and most certainly will be the top crest shale barrier.	Slight dispersion with no breakage. No swelling. Competent sample.	No dispersion with no breakage. No swelling. Competent sample.	No dispersion with no breakage. No swelling. Competent sample.	No dispersion with no breakage. No swelling. Competent sample.	No dispersion with no breakage. No swelling. Competent sample.	No dispersion with no breakage. No swelling. Competent sample.
BADAMI #4 11,196' SAMPLE 3	Black shale interbedded with medium brown silty/very fine sandstone. The black shale has a metallic looking speck included in its matrix. Rock breaks at the bedding planes easily.	No dispersion with no breakage. No swelling. Competent sample.	Very slight dispersion. No breakage and a competent sample.	No dispersion with no breakage. No swelling. Competent sample.	No dispersion with no breakage. No swelling. Competent sample.	No dispersion with no breakage. No swelling. Competent sample.	No dispersion with no breakage. No swelling. Competent sample.
BADAMI #5 11,261' SAMPLE 4	Dark gray/black very silty shale. Large blocky beds. This shale should not be penetrated in this project but if it is, the rock potentially can give problems.	Very slight dispersion with No breakage. No swelling. Sample competent.	No dispersion with no breakage. No swelling. Competent sample.	No dispersion with moderate blocky pieces. No swelling. Competent pieces.	No dispersion with no breakage. No swelling. Competent sample.	Very slight dispersion. No swelling. Many Blocky pieces when shaken. competent sample.	Very very slight dispersion. No swelling. some blocky pieces when shaken. competent sample.

MI SWACO

No. Project: AS086-1115-2005
Analyst: George McMennamy
Date: 11-15-05
Sample Identification: Eight coil tubing drilling samples from MI SWACO, Alaska. (LM#20053185)
Request: Mineralogy and cation exchange capacity (CEC).
Testing Procedure: Semi-Quantitative XRD, XRF and MBT.

Mineralogical Data:

Badami

	Sample #1 11,152 Feet	Sample #2 11,155 Feet	Sample #3 11,196 Feet	Sample #4 11,261 Feet
Smectite *	8%	9%	5%	15%
Kaolinite	5%	10%	5%	5%
Illite/Mica	10%	20%	10%	15%
Chlorite	-	5%	-	-
Dolomite	1%	-	1%	-
Feldspar	7%	5%	3%	5%
Quartz	69%	51%	76%	60%
CEC, meq/100 gr	7	7	4	12

Milne Point

	Sample #1 7,405 Feet	Sample #2 7,791 Feet	Sample #3 7,810 Feet	Sample #4 7,840 Feet
Smectite *	16%	23%	15%	10%
Kaolinite	10%	10%	12%	5%
Illite/Mica	20%	20%	20%	10%
Calcite	-	-	-	3%
Feldspar	5%	3%	4%	5%
Quartz	49%	44%	49%	67%
CEC, meq/100 gr	13	18	12	8

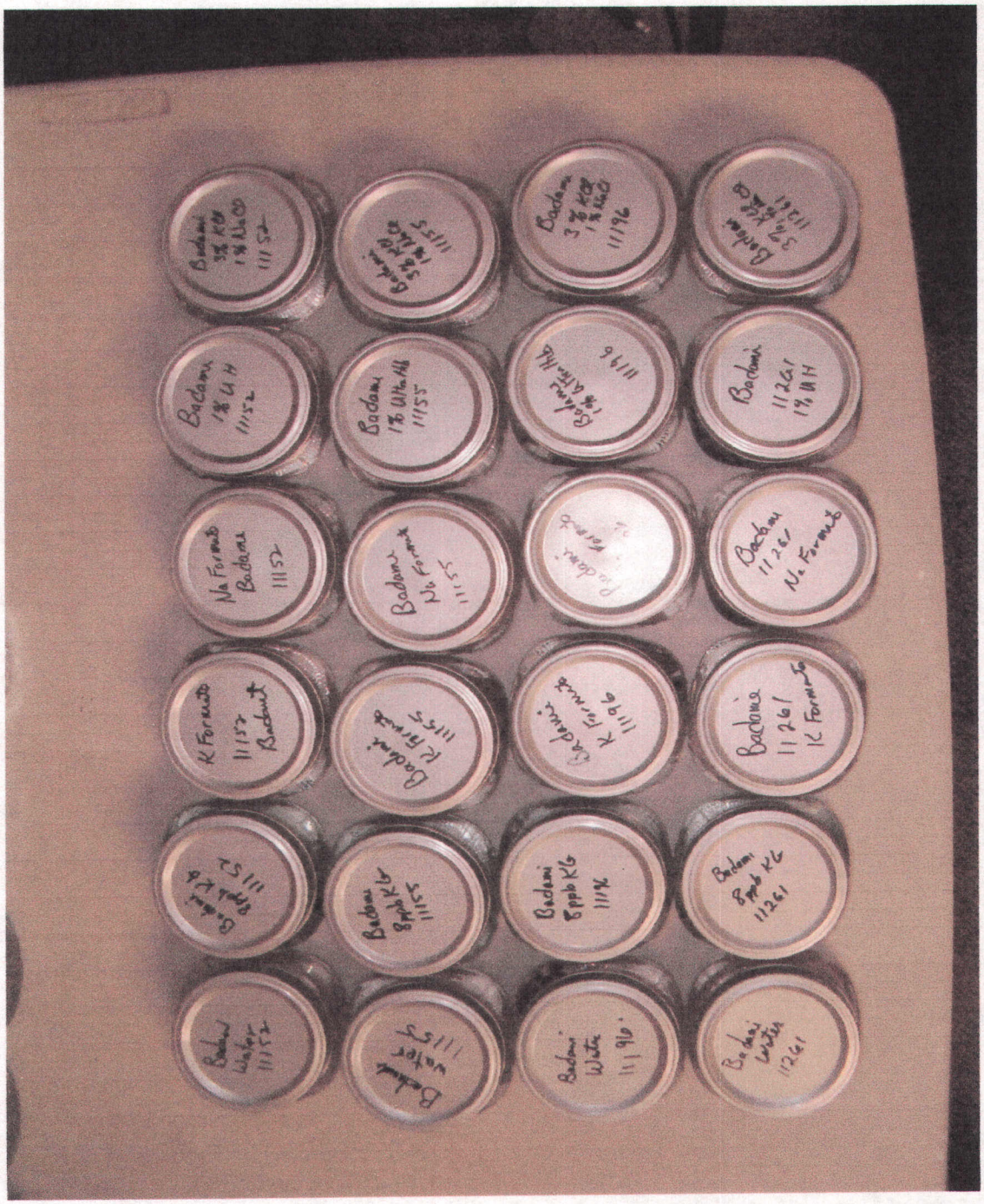
Note: *Includes illite/smectite mixed layer.

Copies To:
Rick Morris
Marc Churan

Signed:

GMC DATA REPORT 3 2 1

Badami Shale Inhibition Samples



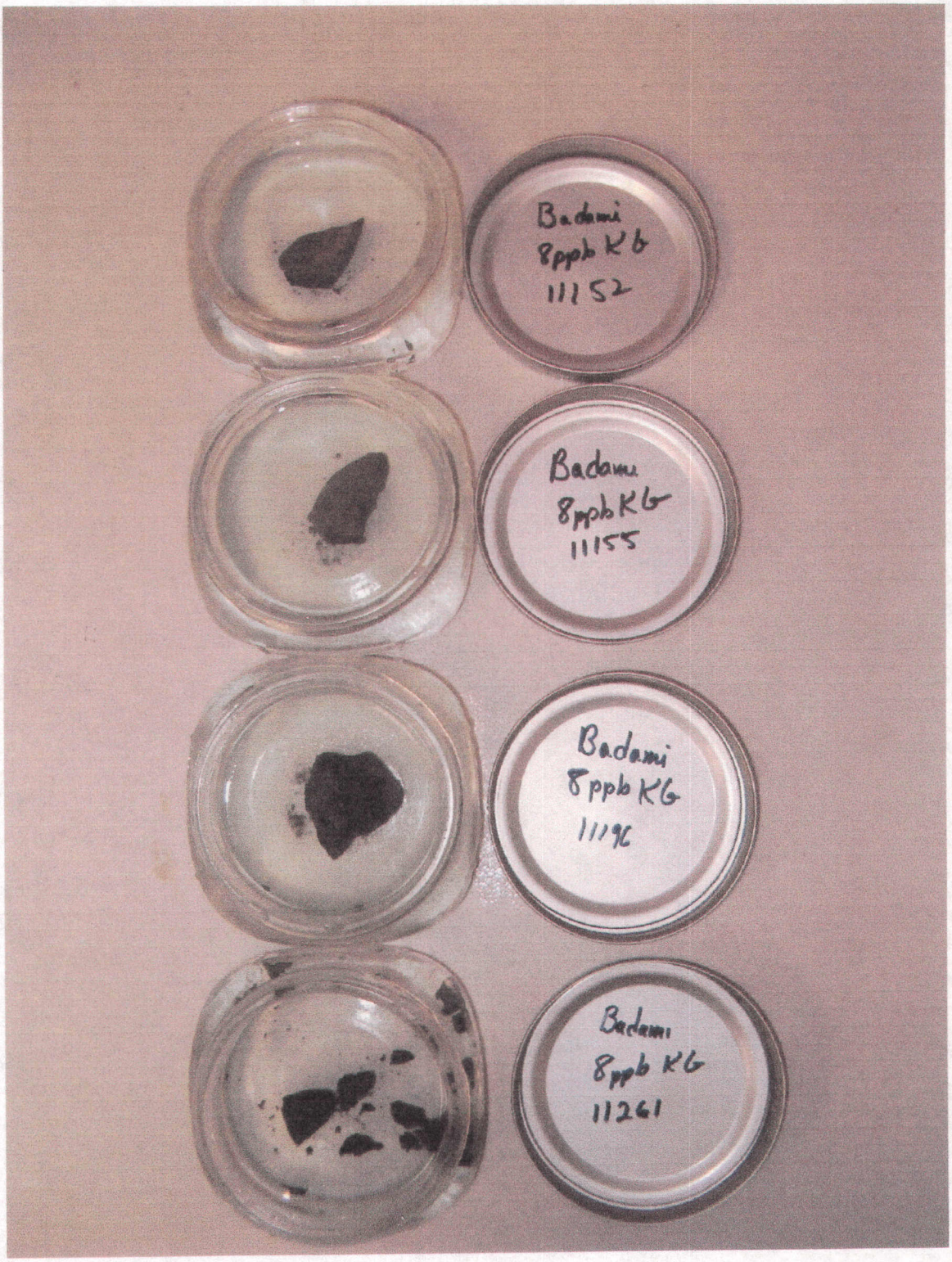
Badami Sample Group—Water-8 ppb KlaGard/water-K+ Formate 10.7 ppg
Na+ Formate 10.7 ppg-1% UltraHib/water
3% KCl, 1% NaCl 8.5+ ppg Brine

All samples have been in approximately 28 days

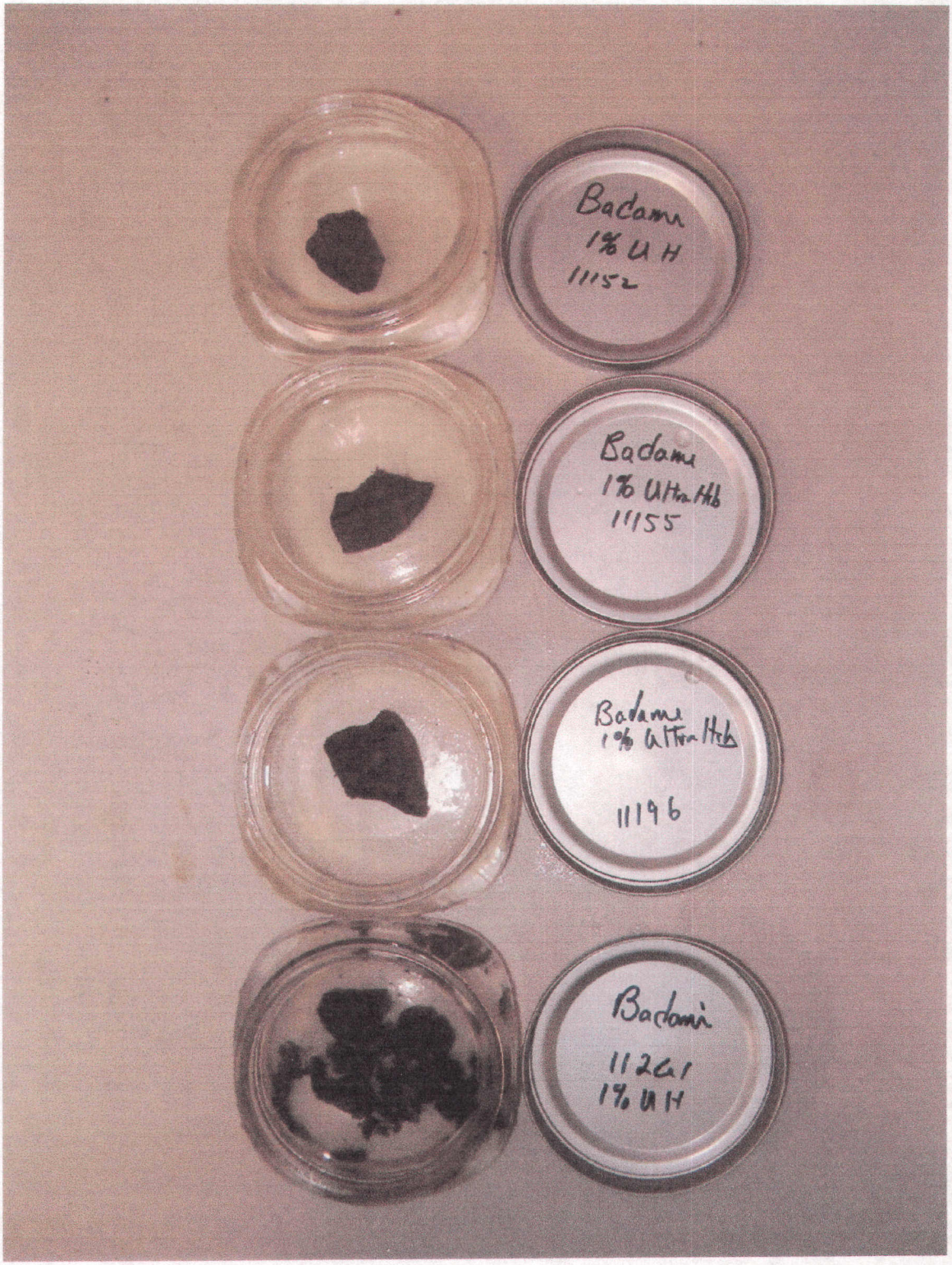
Fresh Water


Badami
Water
11152
Badami
water
11155
Badami
Water
11196.
Badami
Water
11261

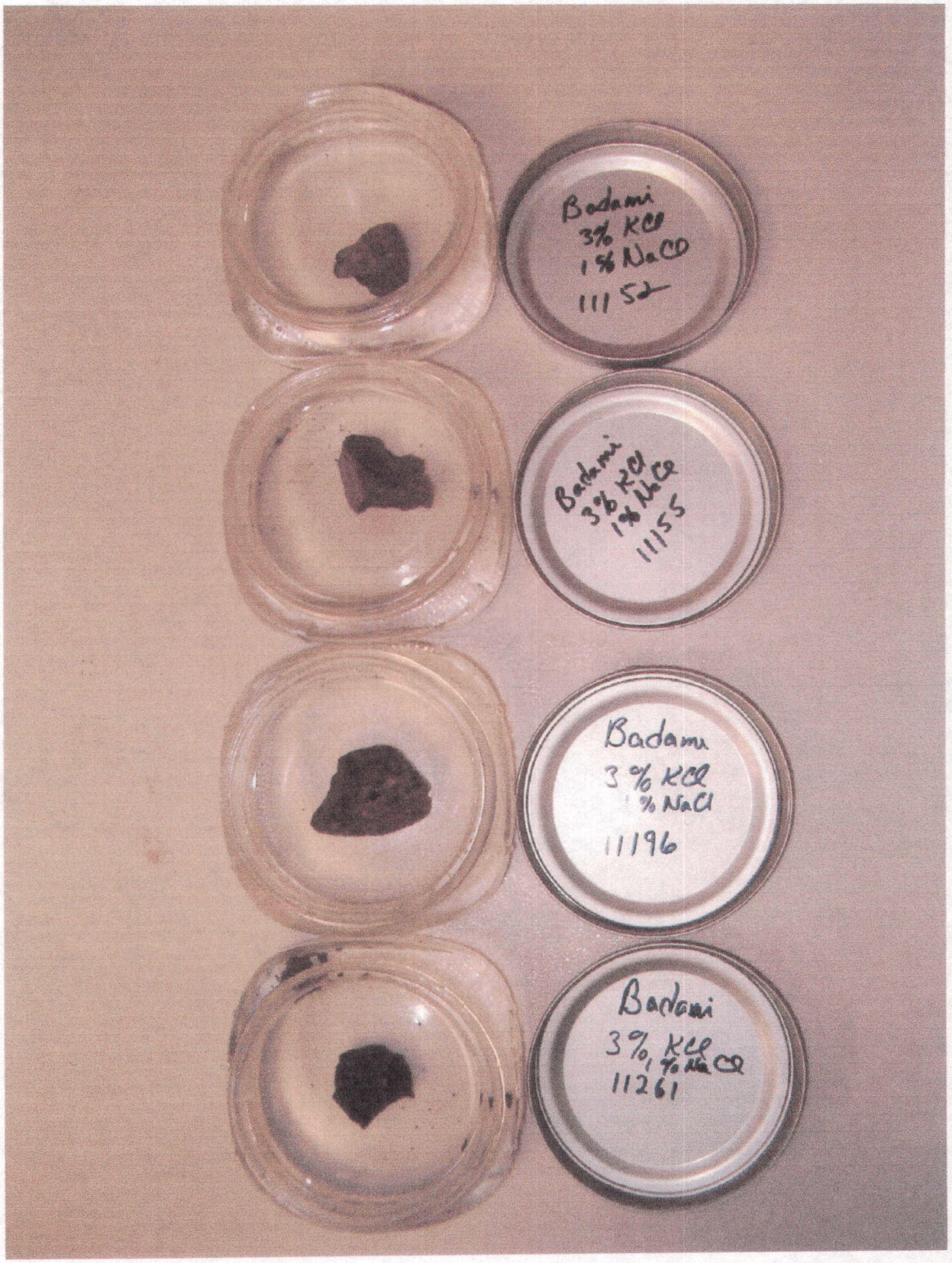
8 ppb KlaGard



1% UltraHib


Badami
1% UH
11152
Badami
1% UltraHib
11155
Badami
1% UltraHib
11196
Badami
1% UH

3% KCl + 1% NaCl Brine 8.5+ ppg (normal concentrations in FloPro SF)



Na+ Formate—10.7 ppg

K+ Formate - 10.7 ppg