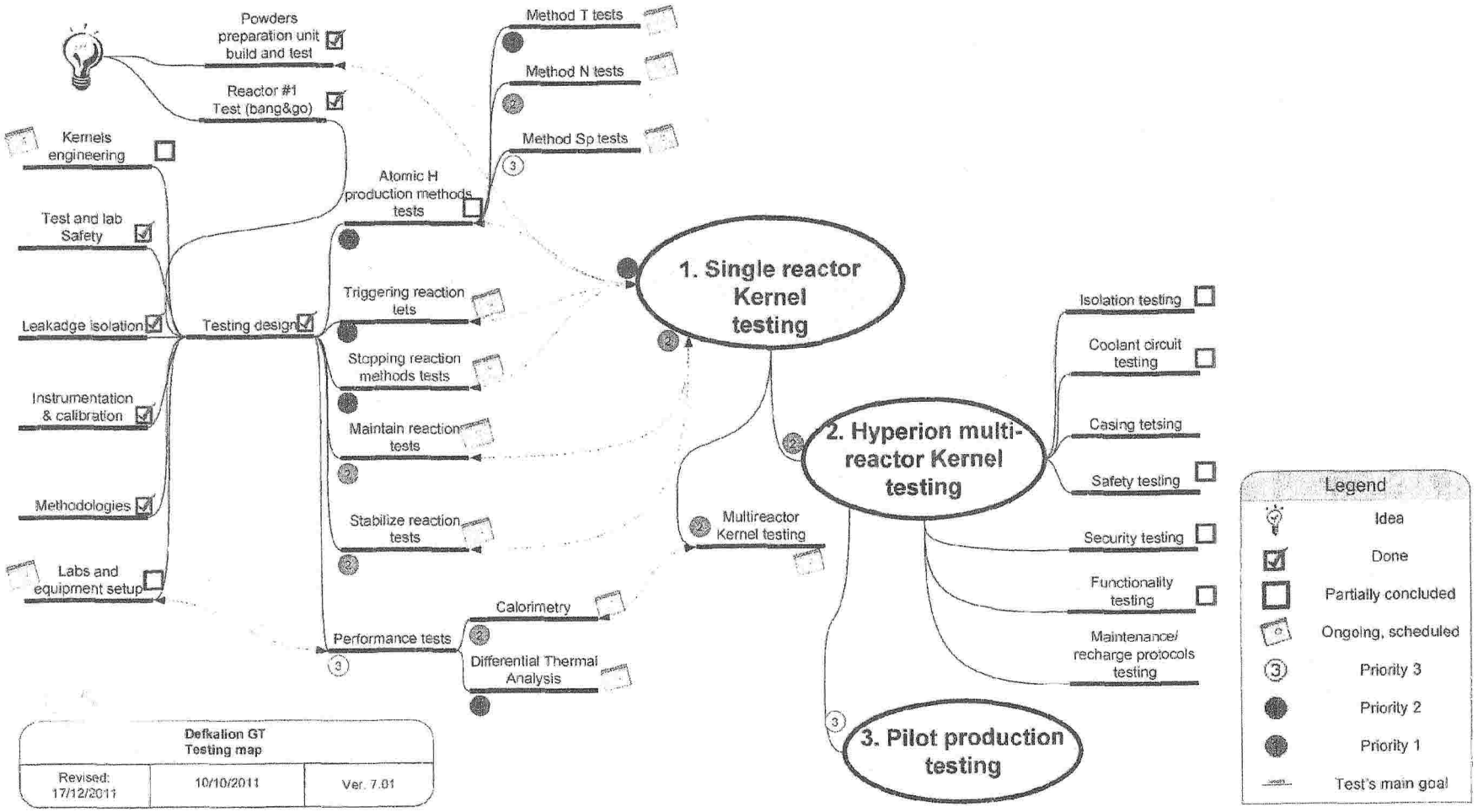


Defkalion GT Testing map		
Revised: 17/12/2011	10/10/2011	Ver. 7.01

Test code: 3.2.19

Hyperion lab devise Functional & Performance Test protocol

Test Plans & Test Results

By: Defkalion GT S.A. R&D Team

Table of contents

HYPERION REACTION TRIGGERING PROCEDURES 4

Overview 4

Test Description; Sub-Systems/ Critical Components Being Tested; Main test objectives; Secondary *test objectives* 4

Approval 5

Test Strategy 7

New Definitions; Important Terminology; Key Words 11

References 11

TEST RESULTS 12

Data Collection Plan; Sampling Plan 12

Measurement Capability, Equipment 13

Test Conditions, Setup Instructions and Calibration 13

Site Related, Requests / Considerations 13

Test Procedure, Work Breakdown Structure, Schedule 13

Assumptions 14

Non expected phenomena observed 14

Photos, videos on testing and special security issues 15

TEST VERIFICATION 16

Test Results 16

Definition of a Successful Test, Observed phenomena 16

Contingencies/ Mitigation for Preliminary or Insufficient Results 16

Analysis of Data –Summary 16

Conclusion on test Design Summary 17

Function/ Performance Reviews 17

References 17

Appendices 17

Appendix 1: Executive summary report 18

Hyperion devise Functional & Performance Test Plans & Test Results

TEST plan 3.2.17

Hyperion reaction triggering procedures

Overview

The 3.2.17 scheduled test on Hyperion reactions triggering procedures is part of the series of triggering and performance tests of Hyperion reactor reactions focusing to investigate conditions that influence reaction's triggering and performance versus expected phenomena.

Test Description; Sub-Systems/ Critical Components Being Tested; Main test objectives; Secondary test objectives

Test description

3.2.15 testing of Hyperion Single Reactor Kernel will follow the same procedure as for all 3.X.X testing protocols. Reaction will be triggered in the R5 type reactor (R5.1, using the following test parameters:

Test parameter	Condition	Remark
Atomic Hydrogen production method	SP	As identified in ICCF17 paper by J. Hadjichristos et all
Internal structure	Typical 5.1	
Calibration and control	Calibration of instrumentation Control run using Argon	Argon run follows the H2
Leakages control	Yes	With the use of AccuprobeUV at, vacuum and H_2 under pressure at min 10bar
Ni mixture	No 8 sample, prepared 2,4gr	
Vacuum	Yes	With parallel heating up to 200C, for 25min
Electric pre- heating	Yes	
H_2	1st input: 1,5 bar 2nd input, 15 bar when reaching mixture temp at >400C if required	
Safety levels	Not changed	

Sub-Systems/Critical Components being tested

R5 Kernel reaction ignition

Reaction ignition is expected following the atomic hydrogen production only with the method SP (high voltage spark generator)

Main test objectives

- **Control (Start, Stop, Increase, Decrease) Reaction ignition**
- **Reaction duration to produce enough energy to exceed equivalent energy of a chemical reaction of mass of components internal to the reaction chamber**
- **Total accumulated energy output divided by total accumulated energy input greater than 1**

Independent testers/observers

The test will be performed IN the presence of [redacted], [redacted] under grant paid for by the [redacted]

Test will be photographed and videoed from DGT and the independent testers/observers

Following the test, observers will sign a Report based on the measurement of the present protocol, as described in Appendix 1 herein.

Secondary test objectives.

- Get excess heat with COP>1
- Run the test for as long as required to assure that excess heat is not due to chemical reactions
- Repeat test to assure consistency of results
- Control using Argon to isolate the dependence of Hydrogen in the reaction
- To capture thermocouple data on going into and coming out of the reactor to assess delta T across the thermal fluid circuit independent of DGT data
- To calibrate flow meters using scale and stop watch
- To spot check the power measurements with independent loop meter provided by DGT (RMS factored post test on LabView data).

Approval

Approved by: John Hadjichristos (18/7/2012, RDF.101.18-7-2012)

Distribution:

Team Head Members

JH, Theoretical analysis

CT, Chemical analysis

CI, Safety and Engineering

CH, Electric and electronics

SA, Lab operations and technical support

AM, Logistics support

BOD DGTG, CEO

Guide – JH

Sponsor – Defkalion GT BOD

Test Strategy

*Note to Teams: The important components of the **Test Plan** and later **Final Test Plan** are:*

1. ***Reactors type R5***
2. One reactors of type R5 will be configured to run with flow calorimetry.

R5.1 will be weight with a scale before or after test.

3. ***Monitor temperature***

Calibrated thermocouples will be present inside the reactor champers, on the external surface of each reactor and in In and Out of the coolant circuit. All temperature monitoring will be through the same DataLogger (NI) and National Instruments Lab-View software. Data sampling per sec.

Observer's thermocouples will be attached in parallel with DGT LabView thermocouples on the coolant circuit.

Pressure will be monitored and logged using both a manual pressure meter on the hydrogen circuit and a digital WIKAI pressure meter to NI Data Loger. Data sampling per 1sec.

4. ***Electric consumption of heating element***

Sampling/data logging for electric energy to the heating elements will be through Carlo Cavazzi accuracy measure M2172D-3 phase energy meter will be every 1sec, logging data in NI board. Manual or when changing conditions upon request of the independent observers/testers, using portable clap A/V meters. L1 is used to power heating elements.

5. ***Electric consumption of spark high voltage***

Sampling/data logging of triggering currents will be through Carlo Cavazzi accuracy measure M2172D-3 phase energy meter will be every 1sec, logging data in NI board. Manual or when changing conditions upon request of the independent observers/testers using portable clap A/V meters. L3 is used to power triggering.

6. **Flow meter**

Coolant in use to perform calorimetry will be a 30% ethyl-glycole mixture. Flow meter will be performed with an Alpha Dynamic (Australia) AM2S pulse (1/4'). Sample of the coolant fluid will be captured and provided to observers for follow up analysis. Final day of test, coolant fluid was changed to 100% water.

7. **Maintenance of reaction**

After pre-heating the reaction to its triggering level, maintenance of the reaction will be performed with the triggering method, decreasing electric energy to the heating elements in order to maintain the internal temperatures in the reaction as steady as possible.

8. **Performance calculations**

Upon completion of each test run, the following calculations will be done manually:

1. Time duration of each stage of the test (in seconds)
2. Electric energy consumption of heating elements (if used) and SP machine in Wh for the total duration of the test.
3. Calculate the areas (integrals) in Temperature/Time graphs and spreadsheet using Simpson's Numerical Integration method.
4. Calculate calorimetric calories in and calories out manually

What you'll test (and what you won't test)

Gamma or other radiation was not tested.

Transmutations were not looked at.

How you'll test: equipment and materials needed, test configurations and procedures

Equipment tested:

As shown in Graph 1

Modifications/changes of equipment since last test

None

Test procedures

1. Leakages testing before test
    a. Hydrogen with ACUPROB UV
    b. Vacuum
    c. Static water if required
    d. pressure decay
2. Calibration Control curves
    a. Run in R5.1 with Argon in the same apparatus with the test run
    b. Calibrate flow meter with scaling of coolant mixture
    c. Calibrate system by introducing a known amount of heat into the system from the heating elements mounted on the wall
3. Cooling method

30% Water/glycol in closed circuit (1st and 2nd day). 100% water in closed circuit (final day). Maintain the reaction bellow safety limit of 850C

4. After shutting down reaction
    a. Remove isolation blanket
    b. Cool the reactor
    c. Inspect both reactors
    d. Save mixture for mass-spectrometry analysis
5. Test procedure

a. Prior to start of test ,dry and hold vacuum in reactors heating to 200C for 45min (approx). Leave the reactor to cool to room temperature
b. 1st input of H_2 at 1,2 bar
c. Preheat the reactor to >312°C
d. Trigger reaction
e. 2nd input of H_2 if hydrogen pressure is less than 2 bar
f. Repeat triggering at will for as many times requested by the observers/testers.
g. When reaching max safety mixture temperature at 850C, vent H2 if required

6. Test data logging:
   a. Time (in sec from start) Clocks between NI data and observer system manually synchronized.
   b. T1(internal), T2, T3, T4, T5, T6 (external on reactors body) from R5.1
   c. Tin and Tout of coolant
   d. Pressure in hydrogen circuit
   e. Volts and Amperes
   f. Gamma/alpha/beta if high definition Muller Geiger is available (not used)
   g. Flow of coolant

Modifications/changes in instrumentation since the last test

None

Instruments calibration expired

No

Responsibilities and the approval process

Typical, as followed in series tests.

Coordinator: JH

Safety officer: CI

Loggers: AH, DF

Safety Risks and contingencies

Caution in:

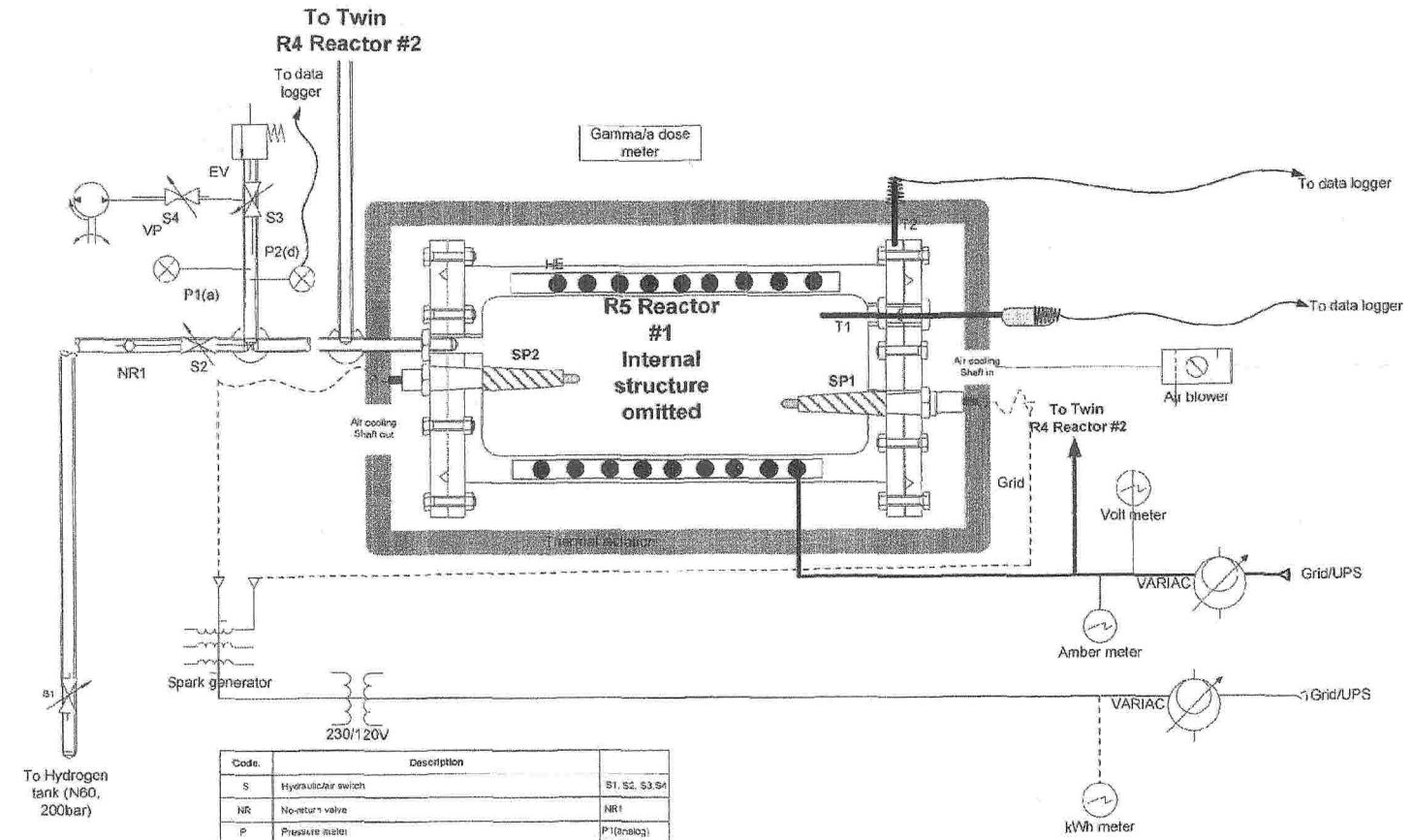
Voltage of SP machine

Important note: All instruments electric input in the same plug to avoid confusing signal noise.

In case of rapid anomalous excess heat at any stage of the test, execute Stop reaction method A. Monitoring the *manual pressure indicator first and very close.*

Reactor and Test Equipment available

As shown in the following diagram:



Code.	Description	
S	Hydraulic/air switch	S1, S2, S3,S4
NR	No-return valve	NR1
P	Pressure meter	P1(analog) P2 (digital)
VP	Vacuum pump	
EV	Exhaust valve	
SP	Spark plug	SP1, SP2
T	Thermocouple (Type K)	T1, T2
HE	Heating element	

Test equipment configuration

Test Equipment needed but not available

None.

Phases of Testing

Phase I : As described above

Phase II: Repeat Phase I the next day, if needed

New Definitions; Important Terminology; Key Words

None.

References

Methods and procedures manual (ver.1.06)

Safety guidelines (May 2012version)

Test results

Introduction:

(To be written after the test)

Data Collection Plan; Sampling Plan

Test Templates/ Tables/ File Locations

Tests files(list or table and file locations):

(To be defined after the test- Please use standard file naming terminology)

Data logger table (synchronize with time stamp)

(as per attached Excel files

R51 Run.xls

R51 Run1.xls

Test Heater.xls

Argon Test.xls

R51 Repeat with water.xls

Flow Cal Test.xls

DGT observer sign	1st observer sign
	

Sampling Techniques changes

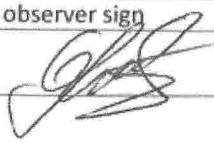
None

Sample Size

Expected 18000 samples, based on a 5 hours duration and 1 sample/sec per channel

Number of samples: As per attached files.

Duration: 5 hours for each triggered reaction run, 1 and ½ hours for Argon triggered run

DGT observer sign	1st observer sign
	

Reporting Problems; Corrective Action

Replaced spark plug and one gasket prior to running 2nd triggered run.

Stopped test on final day due to short in one spark plug.

DGT observer sign	1st observer sign

Measurement Capability, Equipment

Possibly sufficient for determining coefficient of performance with some degree of uncertainty. Assessment of uncertainty will be included in final report after consideration of all data and design limitations of test system for handling 100% water as a cooling fluid for the coolant loop.

DGT observer sign	1st observer sign

Test Conditions, Setup Instructions and Calibration

Sufficient for defined test objectives with a degree of uncertainty.

DGT observer sign	1st observer sign

Site Related, Requests / Considerations

Sufficient for test defined objectives.

DGT observer sign	1st observer sign

Test Procedure, Work Breakdown Structure, Schedule

Meter used to spot check current and voltage input were RMS type as opposed to readings taken by NI LabView which is normal. RMS applied to NI readings post test.

Flow meters appeared to match manual calibration procedure involving scale and stop watch.

One thermocouple on temperature of coolant fluid emerging from reactor of observer's data acquisition system was erratic. It was determined that the thermocouple made a poor thermal connection with the thermal fluid circuit. This was improved prior to control run with Argon.

Hydrogen was added to the system a couple of times due to a small hydrogen leak. Safety was not a concern.

Power readings from wall mounted power source were noisy requiring that LabView be restarted during the test. Therefore two run files were generated which will need to be merged to calculate

total results obtained for full duration of the test. National Instruments is working to resolve the noisy power issue.

Return hose to hermal fluid reservoir began to chug quite a bit indicating that some boiling was occurring inside the reactor. Steam was not given any consideration for calculated energy output of the reactor because flow meters were located prior to entry into the reactor at a point where steam was not a factor in their accuracy. All fluid flowing through the reactor was assumed to be fluid emerging from the reactor when calculating energy produced.

Version of Labview and operating system of host system were.noted.

Copy of Labview setup and project file were collected after the first run of the system as a configuration control.

There were two types of runs. First run was Glycole 30% with Water 70%. Second run on Saturday was all 100% water. First data files with Glycole mix generated "R51 Run.xlsx" and "R51 Run1.xlsx" data files. Second run data files with water only was "R51 Repeat with water1.xlsx", "R51 Repeat with water2.xlsx", and "Flow Cal Test.xlsx".

Note: Test system internal reactor has to be 220 degrees C (optimally 310 degrees C) in order to trigger the hydrogen reaction. Water as a cooling fluid will cool internal reactor down to 140 degrees C if it stays in liquid phase exclusively. Therefore, water must be allowed to operate in a gaseous state within the cooling coils of the reactor to allow the hydrogen nickel reaction to trigger.

DGT observer sign	1st observer sign
	[redacted]

Assumptions

Cooling Fluid used was 30% concentration of Glycol in water (1st and 2nd Day). (A sample was collected to be taken for analysis.) 100% water was used for cooling on 3rd and final day.

30% glycol to water mixture was tested for boiling point and was shown to boil at 123 degrees C.

Second Run was with water only.

DGT observer sign	1st observer sign
	[redacted]

Non expected phenomena observed

None

DGT observer sign	1st observer sign
	[redacted]

Photos, videos on testing and special security issues

Photos: Permitted as part of the test documentation procedure. Photos transferred to DGT via thumbdrive.

Videos: Permitted as part of the test documentation procedure. Videos transferred to DGT via thumbdrive.

No security issues or incidents arose during the test.

Test VERIFICATION

*Note to Teams: Populate the templates and test processes established in **Final Test Plan**.*

These elements can be integrated or rearranged to match test characteristics or personal/team preferences.

Test Results

Defkalion demonstrated >1 COP of accumulated total energy output divided by accumulated total energy input (exact total COP will be provided in final report)

Defkalion demonstrated control of reaction (start, stop, increase, decrease)

Defkalion demonstrated a reaction output greater than equivalent chemical energy from mass of internal components

DGT observer sign	1st observer sign

Definition of a Successful Test, Observed phenomena

See above.

DGT observer sign	1st observer sign

Contingencies/ Mitigation for Preliminary or Insufficient Results

N/A

DGT observer sign	1st observer sign

Analysis of Data –Summary

Further analysis to be provided in final report.

DGT observer sign	1st observer sign

Conclusion on test Design Summary

Sufficient for objectives defined.

DGT observer sign	1st observer sign
	[redacted]

Function/ Performance Reviews

N/A

Debriefing your Guide and Team Consultants

Data provided to [redacted] and as requested by observer. Authorization letters provided by Defkalion upon request.

References

Data files, photos, Defkalion provided description of the reaction as defined in ICCF-17 paper, notes, thermal fluid sample collected, observer collected method.

Appendices

See below.

(Name, sign and put time stamp)

Name, Signature of Team Leaders and observers(with time stamp)					Guide sign

Revised	Approved	Filed
		Date, Location, File
		Filed by:

Appendix 1: Executive summary report

Test observer, [redacted], was asked to come in lieu of [redacted] due to [redacted] current constraints on his travel via air transportation. While [redacted] has been aware of Dr. [redacted] activities to some degree, he is not in possession of all of the previous data and aware of all observations previously obtained by Dr. [redacted] and his team. Mr. [redacted] was asked to collect data that [redacted] will include in a final report that will be written and published. [redacted] will prepare a separate final report that will not be as comprehensive as the report by [redacted]

Defkalion was extremely accommodating during this series of tests and fully cooperated with all requests and test objectives defined during the testing period which started September 6th and was completed September 8th, 2012.

First indications of data generated by DGT sensors connected to LabView seem to indicate that the DGT reactor is performing above what could be expected from a chemical reaction alone. While the reaction appeared to exceed the energy that can be produced by a chemical reaction of a mass equivalent to the internal contents of the reactor (measured to be 59 grams), no precautions were needed to protect from a nuclear radiation or nuclear products of any kind while the reactor was in operation or when it was opened up to change out a sparking node.

Data generated during the testing suggests that the DGT system successfully produced more energy out than input giving a total coefficient of performance (COP) in excess of one. A more precise COP calculation will be given in the final report when a thorough consideration may be given to all aspects of the data collected.

Defkalion was able to demonstrate that the technology has matured to the point that the reaction giving rise to excess energy can be initiated, halted, increased, and decreased.

Defkalion demonstrated dependency of the reaction on hydrogen by introducing argon as a control while maintaining all other steps in the process the same.

Defkalion demonstrated the consistency of calibration of the thermal fluid loop through the reactor by applying heat to the thermal fluid circuit via wall mounted heating elements.

Observer monitored and collected data for delta temperature of thermal fluid circuit in and out of the reactor in general matched data collected by DGT LabView system well enough to provide confirmation of accuracy of results. This will be considered more carefully in the final report factoring in an erratic thermocouple behavior observed on the output temp for the first run. Spot checks of input power and fluid flow measurements supported the accuracy of the measurements collected by LabView. An issue of true RMS of power meter measurements compared to normal readings collected by LabView was raised. This will be resolved in the final report.

Date: September 8th 2012

DEFKALION INTERNAL USE ONLY

DGT observer sign and name	1st observer sign and name
John Hadjichristos Defkalion GTG CTO	On behalf of