

From: Charles Helsley [mailto:fusionpower@hawaii.rr.com]
Sent: Monday, August 03, 2009 11:48 PM
To: Stine, Deborah D.
Subject: Topics for the PCAST meeting

Resolution of the long term baseload energy supply issues is of primary concern. To solve CO2 issues, waste repository issues, and to re-establish growth in the availability of energy for developed and developing economies, a new source of baseload energy is essential. This growth cannot come from wind or solar for neither can be baseload. Nor can it come from fossil fuels - they are all finite resources and thus must peak - and they release CO2. Fission has major problems with waste storage that no-one has been willing to solve. Thus we are left with Fusion as our only alternative. It has been the holy grail of physics for more than 50 years. It is time to make it a reality.

We must have a national program to get Fusion online within a decade. Neither laser fusion nor magnetic confinement fusion can meet a goal of power online in a decade for both have major materials issues to overcome. Other forms of fusion such as electrostatic and magnetized target fusion are far from perfected and in theory only produce small amounts of power.

We must vigorously pursue Heavy Ion Fusion of the form endorsed by scientists more than a decade ago (see GSI-HIDIF reports) if we are to meet the urgent need of a new source of power that is not based on Carbon. I would be pleased to discuss with the committee the process that we propose to use to do exactly that - have fusion power on line in multi-gigawatt amounts before 2020. This will require money and above all, national commitment.

Please contact me if you want additional details or input.

Charles Helsley

From: dmitry novik [mailto:dnovik@verizon.net]

Sent: Monday, August 03, 2009 4:58 PM

To: Stine, Deborah D.

Subject: on the oral comment at the meeting 6-7 August, 2009

I am Dr. Dmitry A. Novik. I would like to make oral comment (5 minutes long) at the meeting 6-7 August, 2009.
I appreciate your respond.

Dr. Dmitry A. Novik
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July 19, 2009

Barack Obama

President of the United States of America
The White House

Nancy-Ann Min DeParle

Director, the White House Office of the Health Reform

Kathlen Sebelius

Secretary, the Department of Health and Human Services

Dear President Obama, Director DeParle, Secretary Sebelius:

I read President Obama's statement issued July 16, 2009 on the American Medical Association's support for H.R. 3200 "*I am grateful that the doctors of the AMA have chosen to support health insurance reform that will lower costs, expand coverage, and assure choice and quality health care for all Americans. Along with the nation's nurses, these doctors are joining the chorus of Americans who know that the time to reform what is broken about our health care system is now.*"

I well understand that in that chorus my individual tiny weak voice would not be heard. Therefore, I decided instead as professional to share with you my thoughts and ideas how to find the solution to the most crucial issue of the availability and affordability of the reform, making that reform as doable and successful – radically decreasing the cost of national health care system and increasing and providing the highest quality of medical care for all Americans independent to their residency and status within the USA.

I hope that might be after serious considerations by you and your senior advisers of these my innovative thoughts and ideas they would be useful in the final discussion and agreements with the Congress of such desperately needed reform of health care system including health insurance reform.

I. Such goals of the reform can not be achieved without your strong political will and support the advanced digital information technology tools and means for increasing the productivity and management of the health care services by medical caretaker – doctors, nurses and pharmacies and hospitals.

What are these advanced digital informational technology tools and means for medical needs? They are:

1. personal portative digital recorders;
2. interactive image data acquisition and compression software.

I.1 Each and everyone medical practitioner (doctors, nurses) should be provided with doctor's personal portative digital recorder. These digital recorders would be used by doctors and nurses for:

- recording dialogue conversation between doctors (nurse) and patient;

- recording doctor's diagnosis, his/her recommendations (including the prescribed medications and follow up medical analysis and visits – if needed) for patient, other doctors, nurses, pharmacists and doctor's information assistant in his/her medical office.

Using such personal portative digital recorder by doctors would free the doctor from any hand writing or computer typing within the time of patient's visit thus essentially increasing the medical productivity of the time spent by doctor with visiting patient, decreasing the time spent by patient in the doctor's office.

In comparison to the standard portative digital recorder widely sold in Best Buy, for example, with the price approximately \$30 the doctor's portative digital recorder has to be modified and simplified by:

- availability to take on and off the digital flash memory chip with memory capacity of no more than 128 MB inside and out of the doctor's portative digital recorder¹;
- eliminate the speaker system from digital recorder leaving only the possibility for listening record by headphone;
- eliminate built-in microphone leaving only the jack to contact the outside miniature microphone attached to doctor's uniform;
- to use instead batteries the rechargeable battery².

Such modifications and simplifications would decrease the complexity of the hardware of the doctor's digital recorder with according decreasing its size, weight, price and simplicity to use and control by doctor.

The process of using doctor's digital recorder by doctor is contained the chain of these steps (procedures):

- at the end of registration of the patient's visit the doctor's office the doctor's information assistant gives to the registered patient his/her flash memory chip with written on that memory standardized personal information of registered patient made by the information assistant;
- visiting the doctor the registered patient gives to the doctor his/her patient's flash memory chip that doctor connect to doctor's digital recorder;
- at the end of the visit to doctor the patient receives from the doctor his/her recorded by doctor the flash memory chip;
- the patient gives to the doctor's information assistant the recorded his/her flash memory chip;
- the doctor's information assistant connect the patient's flash memory chip to the office computer with the same software as for example for SONY IC Recorder; such software provides capability for the necessary digital processing of the recorded digital file from the patient's flash memory chip that supports the secure exchange that file with the doctor's office digital archive, printers as well as the according other distant medical offices, patient's credit cards offices and pharmacies, scheduling the next visit to the doctor's office – if necessary.

I.2 Internet connected computers in some doctor offices and hospital offices as well as mobile medical offices especially in rural areas and outside the nationally

¹ The time of available recording time for SONY IC Digital Recorder is 60 hours with High Quality recording. It means the memory capacity of the flash memory chip for the doctor's digital recorder might be no less than 100 times smaller (with duration of patient' visit to doctor no more than half an hour).

² Each night rechargeable battery of the doctor's digital recorder is charged.

recognized medical centers use the special advanced interactive image software in according to the U.S. Patent Number 5,432, 871 "SYSTEMS AND METHODS FOR INTERACTIVE IMAGE DATA ACQUISITION AND COMPRESSION"³.

Using such highly effective and efficient interactive image data acquisition and compression technology would be crucial for the success of TELEmedicine – telecommunication Internet dialogue between the distant high qualified medical personnel and remote patient and/or medical offices of doctor or hospital for diagnostic consultation and diagnostic decision by such distant highly qualified medical personal based on medical diagnostic analysis of all sorts (X-Ray, CT, MRI, SPECT, PET, ultrasound, nuclear medicine, electrocardiography, ophthalmological, endoscopic, microscopic histological, pathology anatomical and forensic) medical diagnostic images and scans associated with the remote patient as well as the skin images of the different parts of that patient's body.

In the case when the remote by the distance between patient and highly qualified medical professional preventive and diagnostic health care service would be as the rule for the providing the highest medical quality of the diagnostic and consulting health care service independent on the residency of remote patient using such highly effective and efficient interactive image data acquisition and compression technology to the maximal possible degree would be the cost and time consuming the most effective and efficient TELEmedicine health care service.

The crucial role of the necessity to apply that most effective and efficient image data transmission-dialogue through the telecommunication networks (like Internet for example) for TELEmedicine health care service is because not only each bit of digitized images that would be sent through telecommunication systems (networks) is not free and cost some money but also because the bandwidth and accordingly the channel capacity of the telecommunication systems have some natural restrictions that can not be overcome.

The interactive image data acquisition and compression technology according to the U.S. Patent Number 5,432, 871 supports such the most effective and efficient image data transmission-dialogue through the telecommunication networks (like Internet for example) for TELEmedicine health care service.

Such INTERACTIVE image data acquisition and compression technology in which the professional knowledge and expertise of the end user of the system, the highly qualified medical specialist-analyst-diagnost who is analyzed and interpreted the received transmitted digitized medical diagnostic images is used for the essentially (in the range of 10-100 times) increase the data compression ratio in the comparison to the standard none interactive systems and methods of the image data acquisition and compression (like JPEG for example).

Shortly speaking, the interactive image data acquisition and compression technology by the essence is the consolidated two stages lossy AND lossless image data compressions - it is the most professional, interactive way to use the professional

³ I demonstrated successfully in 1994 using software for such interactive image data acquisition and compression for the effective and efficient transmission-demonstration of medical images provided for us by the Walter Reed Hospital and Medical Center of the John Hopkins University from their radiological offices through the ordinary telephone lines (at that time Internet connection .transmission was not widely available yet).

knowledge and needs of the end-user, interpreter-analyst of the image for the most efficient and effective image data compression for compression image data for transmission via telecommunication channel or to write/read into or from memory.

Such interactive image data acquisition and compression technology opens the possibility to use effectively the specific professional knowledge and needs of end-user by establishing the interactive two-ways telecommunication (forward and feed back channels) between end-user as the client and image source as the server image data base.

Such technology provides interactive dialogue between client (end-user) and server (image data base) for the most efficient and effective way to browse the lossy compressed entire image and thus after to select image object(s) for visualization, partition selected image with different image quality.

Client is able to request for browsing first the lossy compressed entire image with requested smaller image quality (the value of Q for lossy JPEG, for example), then watching such lossy version of the entire lossy image to find and select the window(s) of interest (or object(s) of interest, and finally to request to upgrade image quality in the selected window(s) of interest till errorless, lossless image quality by sending lossless compressed image residual data **exclusively** in the window(s) of interest.

Basically such interactive client-server imagery data dialogue is emulation, to some extent, of the efficient procedure of our human two stages vision when the vision starts from using a broad angle of view by peripheral 'lossy, none color' vision, then after to target position of the narrow angle field of view of the fovea sharp, color vision to see finally in the whole details the object(s) of interest selected on the first peripheral stage of the human vision⁴.

II. There are two other innovations beyond the digital information technology applications to health care needs considered in section **I.** above that are able the farther essential decrease of the health care system cost.

II.1. One of them is essential decreasing the medications' cost in the health care system and prescribing by doctors primarily the generic medications.

It is an open secret that the high price of medications is mainly due to the results of the strong lobbying the Washington's power by the most powerful financially and logistically lobbying efforts and advertizing campaigns by the group of the special interests – by the Pharmaceutical Research and Manufacturers of America (PhRMA) led by its President and CEO Billy Tauzin, former Republican Congressman and Chairman of the powerful Energy Committee..

PhRMA is explaining the high cost of designing and manufacturing the medications by the statement that it is because the necessity to invest the huge amount of money from their profit for the research and development the whole spectrum of the new and most effective for the heal care brand medications.

It is simply not true. Hear are the FACTS:

1. Instead investing in the research and development companies constituting that group of the special interests PhRMA recently invested the huge amount of their profits for buying by the PhRMA the very expensive real estate place on the Constitutional Avenue in the Washington D.C. and erecting on that place on the National Mall right before the State Department H. Truman building a

⁴ I am ready any time and at any place to your convenience to demonstrate how that interactive image data acquisition and compression works.

huge building-mansion for the PhRMA's Headquarter. I personally naturally do not know the exact amount of money spent by these companies for erection and maintenance of that mansion for the new PhRMA's Headquarter – according presumably known for you such amount of money must be returned to the Treasure Department by the PhRMA voluntarily or through the court decision. .

2. The huge amount of money companies constituting that group of the special interests PhRMA spent and continues to spend for advertizing their products, brand medications by the all sort of media – on TV, in newspapers and magazines, on Internet.

Such advertisements must be stopped as quickly as possible by the legislation created by the Congress and signed in the law by the President in the same manner as advertisements the tobacco products stopped before. The medical caretakers must receive their professional knowledge of the new brand medications from professional medical and pharmaceutical magazines, journals, conferences and seminars, according printed and electronic publications by FDA and NIH (HSS) and patients from the visit doctor's office.

3. The huge amount of money companies constituting that group of the special interests PhRMA spent and continues to spend for advertizing their products, brand medications by solicitation free from charge packages of these medications and gifts (pens and other office equipment products and so on) to the selected by companies the doctors' offices and hospitals. Such solicitation must be stopped as quickly as possible by the legislation created by the Congress and signed in the law by the President in the same manner as advertisements the tobacco products stopped before. Addiction to the medications (drugs) is no less harmful as addictions to the nicotine of the tobacco products for the health of the American population.
4. Unjustifiable and unreasonable long duration of time of patent protection for the new brand medications intensively lobbied by the PhRMA in a reality is the main barrier that preclude necessary timely investment in the research and development the whole spectrum of the new the most effective medications and spreading the manufacturing and primarily using the generic medications for the health care needs.

Necessary corrections of the U.S. Patent Law must be legislated by the Congress and signed in the law by the President as quick as possible.

5. It is no strange that PhRMA agreed in advance to safe 80 billions of dollars spent by Federal Budget in 10 years period for the cost of medication – one more proof that companies constituting PhRMA **overcharged** medications' cost in previous years more than enough.

It is no secret, it is quite naturally that the most part of the spectrum available for the health care medications and their quantity are used for the health care by Medicare and Medicate patients. Therefore the decreasing the cost for medications paid by the Medicare and Medicate government services might and should essentially decreased burden of Medicare and Medicate on the Federal and States budgets.

It is simply immoral and sin to make too big profit by companies constituting the PhRMA and their stocks holders for providing the medication for the health care of American population.

II.2. It is no less immoral and sin to make any profit⁵ by the huge and redundant numbers (around 13,000!?!) of the privet health care insurance companies and to make their rejection for insurance to the individual by his/her medical preconditions and for individual or group insurance. How successful the privet insurance companies in improving the USA health care system were and are in decreasing the burden for Federal, States, employers and employees budgets is the best described by the statement July 16, 2009 by President Obama – *“the chorus of Americans who know that the time to reform what is broken about our health care system is now”*.

Privet insurance companies **monopolized** and simply destroyed, broken the USA health care system. These privet insurance companies did not product any product; they simply exploited their monopolistic role on the market of the health insurance and making profitable money from insurance payments by majority healthy insurance certificates holders that do not need, fortunately, any health care yet.

Monopoly of the privet insurance companies but not the USA health care system must be broken. Any health insurance company – either privet or public – has to be on the status of nonprofit organization. None profit status of the either privet or public health insurance companies does not mean at all the unavailability of the different kind of none discriminatory health insurance by either privet or public health insurance plans with reasonable number of such different health insurance plans. The diversity of health insurance companies is provided the free choice for the USA residents what kind of health insurance plan and company to choose.

The none profit status of the health insurance companies would: attract needed capital from variety of privet charities and funds that care of the improving the healthy and productive life of the USA population in the manner as other sorts of none profit organizations attracted capital for another common reasonable and responsible goals; made reasonable natural restriction on the number of the effective and efficient privet health insurance companies; simplify to the maximal possible degree the regulations of these companies, manpower and the cost of enforcing these regulations. As the result it would stop skyrocketing unsustainable cost of the USA health care system for the time to come – one of the main tools to support health and creative life for the USA population and to boost national economy.

If either you or your senior advisers have questions please contact me – it is my professional obligation to answer these questions.

Sincerely and respectfully, with wish for success in your leadership, I'm
truly yours

Dmitry Novik

⁵ Vice President of the America's Health Insurance Plan Mr. S. Keefer after the event “Health Care Reform” took place in Brookings July 9, 2009 answered in respond to my two questions that the average profit for privet insurance companies is approximately 3% and that the profit for privet insurance companies is necessary to attract capital from the stock owners on the Wall Street.

From: Semeon Rabinky [mailto:srabinky@comcast.net]
Sent: Tuesday, August 04, 2009 11:39 AM
To: Stine, Deborah D.
Subject: Big request

Deborah D. Stine, PhD

Executive Director PCAST

Email: dstine@ostp.eop.gov

Phone: 202-456-6006

Fax: 202-456-6021

Dear Dr. Stine,

Let me ask you for your help - your help to our Country, President Obama, and the people of America.

Could you please pass my letter to Mr. President.

I have sent our proposals to various entities that are authorized by the President to support the projects in the alternative energy source technologies, but have not received any response.

I am counting on your patriotic desire to change the energy situation in our Country and the whole world to the better.

Thank you very much.

Semeon Rabinky
Richmond, VA
srabinky@comcast.net

Dear Mr. President,

A brief description of our proposals can be found in the annex to this letter.

My appeal to you is dictated by a clear understanding of the vital importance of the proposed project for the destiny of the country and for achieving the goals you have set.

In the short term and with very low costs we can create unlimited, clean energy resources for our country.

Experts and politicians alike, without exception, bet on the currently available solar, wind, nuclear and bio-fuel energy resources in the fight against the «hydrocarbon evil».

Compare that with our project, and you will clearly see that spending hundreds of billions of dollars and decades of time in slowly moving forward using those solutions just does not make sense.

The current Federal program for the development of alternative sources of energy plans to reduce hydrocarbon emissions by 85% by the year 2050. Our proposal will utilize the tremendous scientific and technological potential of our Country and help us reach those goals 30 years earlier. And the costs will be 70-100 times lower than the costs of the other renewable energy technologies.

In the annexes to this letter you will find convincing evidence of our concept. We suggest that no time is wasted for discussions, and the U.S. government supports the development of one experimental well in Nevada, which requires a relatively small amount of funding.

The success of this undertaking will resolve the main challenges to the national security, economy and environment of our Country by creating a powerful National Energy Center in Nevada, where the resulting hydrogen and the wells could provide cheap electricity for the entire Country;

This is the case of the revolutionary, innovative scientific theory leading to the fundamental changes in the world. It needs your support, Mr. President.

With the hope to be useful to you and the Country,

Semeon Rabinky

Richmond, VA

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Dear Mr. President ,

Our innovative project is based on the Hydridic Earth theory proposed by a Russian geologist, Dr. V. Larin.

The theory provides a new understanding of the genesis and the structure of the planets of the Solar system (Appendix 1).

Its practical conclusions are of global importance for the energy and other resources for the future of Earth. One of the most important conclusions states that under the Nevada desert, at the depth of 1,500-2,000 meters, there is a deposit of natural silicides with the volume of approximately 5,000 cubic kilometers.

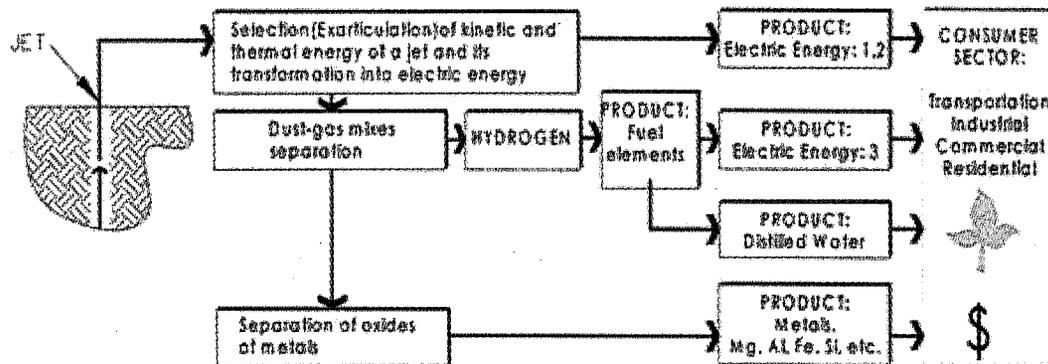
When reacted with water, 1 kilogram of silicides yields 1,200 liters of hydrogen gas, 13.5 Megajoules of heat, and by-product oxides of magnesium, silicon, iron, aluminum, and calcium.

Based on that data, the usage of approximately 25 square kilometers of surface area in Nevada for exploiting the silicides deposit would supply the U.S. energy requirements for 100 years replacing oil and natural gas.

We have developed a low-cost, efficient and safe method of extracting the above-mentioned resources using wells.

Each well would supply a power plant with approximately 250 Megawatt installed capacity and produce electricity using fuel cells supplied by hydrogen gas. Additional energy could be produced from the utilization of the by-product heat as well as the kinetic energy of the hydrogen jets.

TECHNOLOGICAL SCHEME OF PROCESSING PRODUCTS OF EXTRACTION OF SILICIDES DEPOSITS



Electric Energy summarizes from:

1. Electric Energy from isothermal heat
2. Electric Energy from kinetic energy from jet
3. Electric Energy from chemical reaction hydrogen & oxygen of air in Fuel elements

Such power plant would cost 70-100 times less than the same-capacity power plant using solar, wind, tide, or nuclear energy.

The power producing fuel cells would generate approximately 800 tons of fresh water per day per well.

Dr. Larin's theory is supported by the scientific facts (see Appendix 2). The theory was published as a book in 1993 in Canada (translation into English) as well as in 2003 in Russia.

Dr. Larin's theory is supported by the members of the Russian Academy of Sciences (see Appendices 3 and 4).

Russian leadership has been ignoring the recommendations of the Russian scientists, because it is only interested in developing the hydrocarbons-based energy.

Our group of scientists and engineers, which includes by Dr. Larin, would like to invite YOU to support the project, which would include

- Exploration for the selection of the site for the first exploratory well;
- Drilling the exploratory well to reach the silicides deposit;
- R&D and engineering studies related to the technologies to be used in modeling and utilizing the well resources.

We are absolutely convinced that the project will be successful in providing access to the exploitation of the silicides in a relatively short time and with a relatively small investment. That, in turn, would allow achieving the following:

- Provide a new, unlimited and environmentally clean energy source for the United States on its territory;
- Using the U.S. technological potential, achieve energy independence in approximately 3-4 years. That would resolve the main economical, geopolitical and environmental problems for the country.

If we take into account the possibility of our project, then spend more money on "clean coal", on the extraction of oil from sand, for drilling in Alaska and the Ocean, it seems a criminal waste of money States.

Dear Mr. President ,

help to us drilling the exploratory well in Nevada and the United States will receive unlimited, clean and cheap energy.

Price subject for USA --to \$ 2 trillion a year , full of energy independence and clean Ecology in 2015!

I look forward to your prompt response.

Thank You.

Semeon Rabinky

Richmond, VA

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APPENDIX 1

CONCEPT of PRIMORDIALLY HYDRIDE EARTH:

CONCISE SUMMARY

1. Formation of the Planets of the Solar System

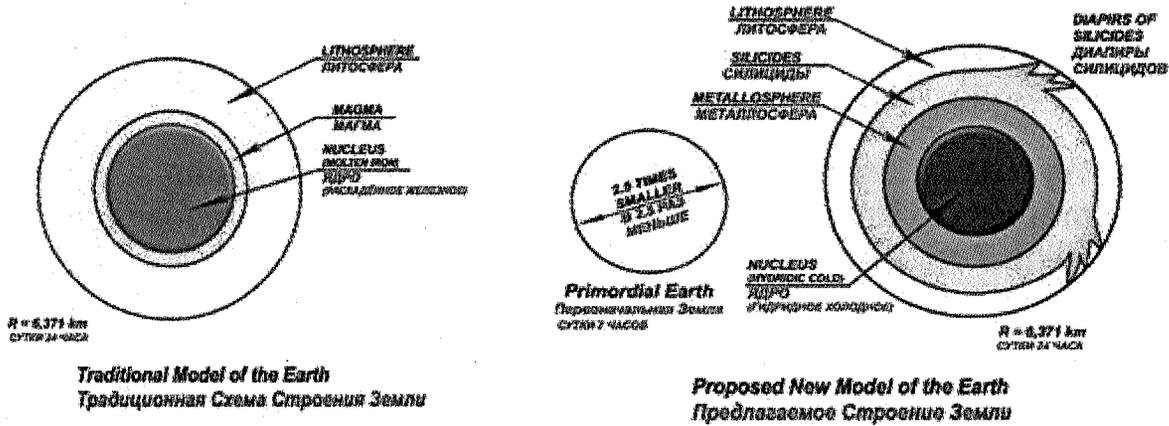
The current theory claims that after the Supernova explosion, the space dust was moving away from the Sun driven by the solar wind pressure. Therefore, the lighter particles, including hydrogen, flew away farther while the heavier particles stayed closer to the Sun, which means that the Earth is made of the heavier elements and there should be no hydrogen.

The incentive for the creation of the theory of doctor Larin was the idea of English astrophysicist, Nobel laureate Fred Hoyle on the motion of ionized particles of proto-planetary matter drive across the magnetic lines of force.

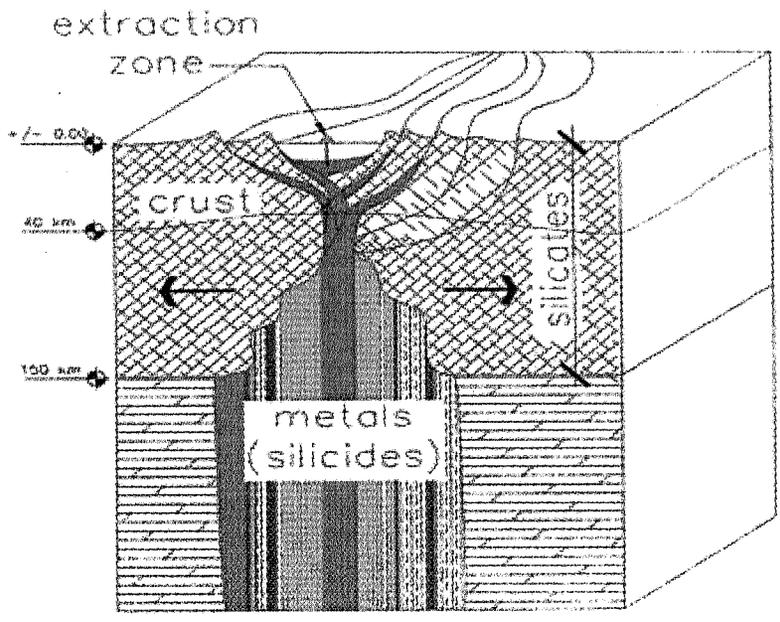
According to the Larin theory, the dust was moving away depending on the ionization potentials of the chemical elements. Therefore, hydrogen was retained in the Earth body and is present in very large quantities.

2. The Structure of the Earth

The current theory claims that the Earth structure includes a hot nucleus made of iron, enclosed in molten magma, then in a hard silicate layer (lithosphere) – see Exhibit 1.



SCHEME OF STRUCTURE OF EARTH CRUST



According to the Larin theory, the nucleus is made of hydrides – metals saturated with hydrogen – and it is cold. The nucleus is

enclosed in the metallosphere and silicides, and then in the silicate lithosphere.

The current theory claims that the Earth radius is 6,371 kilometers and is constant.

According to the Larin theory, the original Earth radius was approximately 2.5 times smaller, and the planet was rotating faster (the day was 7 hours, not 24 hours).

3. Continental Drift

The current theory claims that continents drift because they float in the molten magma.

According to the Larin theory, continents were formed by rifting of the silicate lithosphere while the Earth was expanding.

APPENDIX 2

Well-known Facts Confirming the Concept

The direct confirmation was obtained when Russian scientists have in fact found millimeter-sized particles of metal silicides in water samples taken at the ocean floor in the Mid-Atlantic rift zone.

The indirect proof comes in multiple facts that cannot be explained by the current theory of Earth formation and structure, while they are easily explained within the Larin theory:

- Volcano eruptions emit hydrogen into the atmosphere where it explosively combines with the atmospheric oxygen.
- In certain areas of the world, e.g. in Iceland, hydrogen gas is emitted as gas fountains.
- The atmosphere studies had proven a long time ago that Earth is losing thousands of tonnes of hydrogen gas to the space annually. The current theory cannot explain where the hydrogen is coming from.
- Recent studies by the Washington University scientists concluded that there is an ocean of water at the depth of 1,000 kilometers under the continent of Asia. That is totally inconsistent with the current theory.
- Hundred thousand tons of hydrogen and methane is leaving Earth into space through the Earth ionosphere, according to the measurements by the experts on the ionosphere.
- During the eruption of volcanoes, ten thousand cubic kilometers of hydrogen and methane is thrown out, according to the measurements by the volcanologists.
- Scientists of university of the State of Washington 4 years ago having studied 600 thousand seismic measurements came to a conclusion that there is the ocean of water under the continent of Asia at the depth of 1.5 km. Per traditional theories, this cannot be happening as the temperature at such depth should be hundreds degrees Celsius. Dr. Larin's theory says that the intermetallic compounds normally show the seismic properties very similar to those of water.
- Deep-water expedition of the Russian Academy of Sciences in 2005 has found out in tests of a ground from a deep-water hollow in Atlantic Ocean in rift zone ferriferous silicides and has drawn a conclusion that this is a direct confirmation of the theory of "Hydridic Earth".

- **Dr. Larin's expedition using unique compact equipment found and mapped intensive allocations of hydrogen on the Russian Platform between the cities of Moscow and Ryazan. According to the "Hydridic Earth" theory, the planet Earth has many similar areas with intensive allocation of hydrogen, but they are not investigated yet as scientific world is not using Dr. Larin's theory. Similar zones can be used for industrial production of hydrogen by drawing down the boreholes.**

MINUTES

of the joint meeting of representatives from the Division of Geology, Geochemistry, Geophysics and Mining and the Division of Physico-Technical Problems of Energetics of the USSR Academy of Science on possible discovery of a radically new source of energy in zones present rifting

October 23, 1989, Moscow, Geological Institute, USSR Acad. Sci.

PRESENT:

Yu.N.Rudenko, Academician Secretary of the Division of Physico-Technical Problems of Energetics, USSR Acad. Sci. (Div. of Ph-TPE).

N.A.Shilo, academician, Division of Geology, Geochemistry, Geophysics, and Mining, USSR Acad.Sci. (Div. of GGGM).

A.L.Yanshin, academician, USSR Acad. Sci. (Div. of GGGM).

Yu.M.Pushcarovsky, academician, USSR Acad. Sci. (Div. of GGGM).

A.A.Makarov, a Corresponding Member, Director of the Institute of Problems of Energetics, USSR Acad. Sci. (Div. of Ph-TPE).

A.L.Knipper, a Corresponding Member, Director of the Geological Institute, USSR Acad. Sci. (Div. of GGGM).

T.M.Eneyev, a Corresponding Member, USSR Acad. Sci., Institute of Applied Mathematics.

B.M.Kaganovich, doctor of phis. math. sci., Siberian Energetics Institute, USSR Acad. Sci., (Div. of Ph-TPE).

Ye.Ye. Milanovsky, a Corresponding Member, USSR Acad. Sci. (Div. of GGGM).

S.Ya.Sergin, doctor of geography, professor, the scientific research institute "Priroda" ("Nature") of the USSR State Committee for Nature Preservation.

A.S.Perfiliev, doctor of geology and mineralogy, Geological Institute, USSR Acad. Sci. (Div. of GGGM).

B.G.Polyak, doctor of geology and mineralogy, Geological Institute, USSR Acad. Sci. (Div. of GGGM).

V.Ye.Fadeyev, doctor of geology and mineralogy, Geological Institute, USSR Acad. Sci. (Div. of GGGM).

V.N.Larin, doctor of geology and mineralogy, Geological Institute, USSR Acad. Sci. (Div. of GGGM).

A G E N D A

A contribution by V.N.Larin devoted to a new geochemical model of the Earth advanced on the basis of the regularity that speaker determined in the distribution of chemical elements in the solar system. In that model, the silicate oxic shell of the planet can be traced only to a depth of 300-350 km while deeper, as far as core of the Earth, the mantle is composed of oxygen-free alloys and compounds dominated by Si, Mg, and Fe. The speaker pointed out to the new model's conformity with the thin structure of the mantle's layer "C" established seismically.

In the light of the new model, zones of rifting should be accommodating an upwelling of deep, oxygen-free substance in the form of diapirs. It is suggested that in some areas of rift structures, separate tongues of these diapirs may reach horizons accessible to modern drilling technologies; it is believed that this areas can be reliably identified with special geochemical and geophysical studies.

Helium isotope geochemical survey carried out by researchers from the Geological Institute, USSR Acad. Sci., in the Baikal rift zone suggests that the

maximum upwelling of the mantle diapir is to be found in the Tunka rift depression, which is situated in the southern-western part of Baikal rifting area. It stretches latitudinal to 150 km, and is up to 35 km wide in its middle part.

Deep electro-magnetic sounding of this structure (East Siberian Institute of Geology and Geophysics, and Mineral Resources, Irkutsk) has identified in it at a depth of 5-6 km an extensive zone with abnormally high electric conductivity whose source is not yet clear. It should be noted that similar zones with anomalous conductivity have been identified in all young rift structures of the Earth but at slightly bigger depths (about 10 or 15 or 20 km).

Dr. Larin emphasized that according to his new model of the Earth, the anomalously high electric conductivity in the interior of rift structures could be attributed to the penetration in those horizons of deep anoxic compounds and alloys that would have exactly the same (semiconductor) conductivity. If this prediction is confirmed by drilling, it will lead to an altogether new source of energy since Mg and Si when interacting with water, release a vast amount of heat and hydrogen. In addition, this presumptive source of energy is to be ecologically clean and inexhaustible (in terms of human needs).

A preliminary technical and economical assessment made by the Siberian Energetics Institute, USSR Acad. Sci. Siberian Division (Irkutsk), has shown that provided the prediction of anoxic alloys at accessible depths is confirmed, this presumptive source of energy may prove competitive at the energy market.

The speaker answered numerous questions followed by discussion during which the participants of the meeting pointed out the exceptional significance of the problem, and the fundamental approach to its solution.

Results of the discussion were summarized by A.L. Knipper who mentioned a surprising fact that super-deep drilling carried out in this country for some reason was never planned in zones of present rifting though it might find there answers to the most acute problems of geology; it is the more important now as there is every reason to believe that such drilling will discover a new, pollution-free and inexhaustible source of energy that would improve living conditions for the world population.

The following DECISIONS were adopted:

Recommend super-deep drilling (to 10-12 km) in zones of present rifting as such has never been undertaken before in rifting zones. The Tunka depression can be proposed as an object of drilling; there, along with a number of fundamental problems of geology that such drilling may help to solve, drilling is important for energetic and ecology as it will help evaluate and test the scientifically substantiated discovery of the new and pollution-free resources of energy (heat and hydrogen) that may challenge the traditional sources of energy.

In order to specify the drilling site, it is recommended the additional geophysical studies be carried out in the Tunka and Muya-Kuanda rift depressions (gravimetry, seismics and deep electro-magnetic sounding). It is recommended that Division of Geology, Geochemistry, Geophysics, and Mining, and the Division of Physico-Technical Problems of Energetics of the USSR Academy of Science broaden the research carried out on that topic.

In order to raise funds for the above, respective invitation be directed to the following institutions: State Committee For Science and Technology, Bureau of the USSR Council of Ministers for the heat and energy complexes, Ministry of Geology of the USSR, State Committee "Priroda", Division of Geology, Geochemistry, Geophysics and Mining, and the Division of Physico-Technical Problems of Energetics of the USSR Academy of Science.

Director Geological Institute, USSR Acad. Sci.

Corresponding Member, USSR Acad. Sci.

A.L. KNIPPER

APPENDIX 4

TO: Dmriy Medvedev

(Translated into English)

First Deputy Prime Minister

Of the Russian Federation

05.17.2007

cc: N.P. Laverov, Vice President of the Russian Academy of Sciences (RAN)

Three years ago President Bush proposed that the U.S. Congress appropriated \$1.7 billion for the "hydrogen automobile" development program. In our opinion this is a very indicative fact. Experts are currently discussing the prospects of switching the energy sector to hydrogen, while hydrogen itself is called the fuel of the future. In fact, hydrogen possesses numerous advantages compared to the traditional fuels, and the principal advantage is that it is environmentally clean: burning hydrogen in the power plants, in the vehicle engines or fuel elements produces distilled water only. In addition to that hydrogen-based energy could reduce dependence of the developed nations on the Middle Eastern oil and therefore, by means of the lower crude oil prices, could reduce the oil-based funding of the international terrorism. Crude oil could then be used more wisely: there is a reason for Mendeleev's saying "burning oil is the same as beating a furnace by burning banknotes."

Hydrogen-based energy undoubtedly has the great prospects, however there is a big problem related to the large-scale production of hydrogen. It is currently proposed to produce hydrogen using electrolytic dissociation of water. Unfortunately, the consequent usage of hydrogen as a fuel will produce significantly less energy than required for its production. Also, the global fleet of automobiles consumes more energy than generated by all power plants of the world combined. Therefore it is currently impossible [to switch to the hydrogen fuel]. Many experts view that as a dead end.

At the same time, a new geological theory of the internal composition of the Earth zones, which was developed by Vladimir Larin, PhD, Geology, opens the principally new possibility for the industrial production of hydrogen. That theory was tested and proven: it served as a basis for predicting previously unknown geological features which were viewed as totally impossible under the currently adopted concepts. Moreover, in 1989 the joint session of the two sections of the Soviet Academy of Sciences -the Geological Sciences Section and the Physical-Technical Energy Problems Section -recommended that the government funded an exploratory drilling project. That project was included in the ' structural drilling" budget of the; hen Ministry of Geology. However, the consequent political events (perestroika, etc.) prevented' the project from being realized.

Drilling was planned to be conducted in the Transbaikalia region. Hydrogen can be produced in a very limited number of locations throughout the world, namely in the zones of the modern rifting where, according to the Larin's theory, intermetallic tongues rise from the depths to almost the surface of the Earth. The intermetallics are mostly composed of the following elements (in descending order): silicon, magnesium, iron, aluminum, calcium, etc. Judging from the geophysical data~ the volumes of intermetallics at the depths within reach can be measured in cubic kilometers. Each kilogram of the intermetallics, when reacted with water, yields 1,200 liters of hydrogen, plus additional 13.5 Megajoules of heat -i.e. the amount of heat generated by burning) kilogram of brown coal. In other words, the proposed method allows producing hydrogen from water without any energy costs, plus producing energy as a by-product. The resources of this principally new energy sources are practically inexhaustible which leads to a revolution in the global energy and economics.

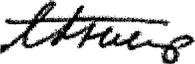
In the present time, based on his experience, Dr. Larin and his co-workers possess a clear vision of what needs to be done in order to detect the zones where intermetallics reach the depths accessible to modern mining methods. Detailed plans for the period of four years were developed. Total costs are \$14.5 million including drilling. The principal solutions were patented.

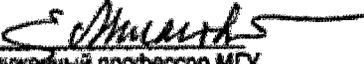
With the available funding, Dr. Larin and his co-workers are ready to take on the responsibilities for making those plans a reality, which promises to open a new era -the era of clean energy -and to improve the life of mankind on Earth.

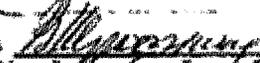
водород (из воды), не затрачивая энергию, но получать ее попутно. Запасы этого, принципиально нового, источника энергии, практически неисчерпаемы, что обещает революцию во всей земной энергетике и экономике.

В настоящее время, на основе накопленного опыта, д-р В.Ларин и его сотрудники имеют четкое понимание, что нужно делать (и в какой последовательности) для выявления зон, где интерметаллические сплавы находятся на глубинах, достижимых горными выработками. Составлены детальные планы дальнейших работ, рассчитанных на 4 года. Общая стоимость - 14,5 млн. \$ (включая бурение). Основные направления защищены патентами.

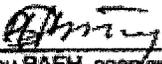
При соответствующем финансировании д-р Ларин и его сотрудники готовы взять на себя ответственность за реализацию этих планов, что обещает открыть новую эру - эру чистой энергетики и позволит радикально улучшить условия существования человеческого сообщества на Земле.


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От имени большого числа молодых ученых
А.В. Артамонов
Кандидат геол.-минер. наук

(Pluses and Minuses)

V.N. Larin, N.V. Larin



Picture 1: Vladimir and Nikolai - geologists.

Today the entire world dreams about switching transport and energy to hydrogen. This dream is particularly strong among the heavily industrialized countries, where dependence on hydrocarbons has long become a heavy burden. Hydrogen is an excellent source of energy. In the 1980's, the Soviet Union has conducted successful flights of jet liners on hydrogen fuel. The use of hydrogen offers great benefits in space affairs - with the same starting mass a missile on oxygen-hydrogen fuel is capable of putting into orbit three times the load than a missile on oxygen-kerosene fuel. The burning of hydrogen significantly improves the efficiency of turbine generators for producing electricity. And we should not forget that during the combustion of hydrogen the only byproduct is pure water that can be drunk without the any fear.

But what really blows our minds is the design of cars fueled by hydrogen. It turns out that already in the end of the 19-th century a method was known for obtaining electricity via a direct chemical reaction between hydrogen and oxygen, with practically no heat released. Already then it was discovered that if hydrogen and oxygen are separated by a permeable electrolytic

membrane, a reaction would occur without burning; but with the release of electrical energy. Today, fuel cells of this type have been perfected so much, that they are widely utilized to obtain energy aboard the American space shuttles in orbital flight.

Now imagine a car equipped with such fuel cells. This car has a very compact electrical motor; it doesn't need an injection system, an ignition system, a cooling or a lubrication system... In short, compared with the modern internal combustion engine, an electric engine is ridiculously simple and thus significantly more reliable and dependable. Such an engine will never have a problem with launching, and it doesn't need a gearbox. It doesn't need an exhaust pipe because it produces no exhaust - thus it is noiseless, and the only by-product is the aforementioned pure water. In an electric car the air conditioning and heating system work independently of the engine because those systems are autonomous. If you are snowed in and hopelessly stuck, which happens sometimes, you can comfortably wait for help for a week inside your car, in comfortable temperature, without any fear to get poisoned by the exhaust gases.

In short, this is not a car – this is some kind of fairy tale dream. And it has already come true – those magical cars are already treading the roads. Many leading auto manufacturers continue the race for creating more and more incredible masterpieces. Among other things, cars with fuel cells are incredibly economical – their efficiency stands at 80% while a modern gasoline engine trails behind at a mere 40% - the rest is emitted into the atmosphere in the form of exhaust gases. Just like that – the majority of energy goes down the exhaust, and in a form of toxic gases at that. Isn't this so "last century"? Just imagine how our environment would change if everyone started driving those new cars – our cities will become quiet and clean.

So, hydrogen is extremely attractive. But why do we continue to live according to old ways and why don't we hurry to implement a "hydrogen restructuring"? Here is the problem - where can we get hydrogen? On the surface of the planet hydrogen exists in the form of water. Water of course can be subjected to electrolysis and will yield hydrogen. *But, when we use this hydrogen as an energy source, it will yield a lot less energy than the amount spent on producing it.* Thus, in order to convert our transport and energy to hydrogen, we will have to burn a lot more coal and oil, and split more uranium – all of that to achieve a level of energy efficiency we already have. Experts see a hopeless economical dead end here. Areas where hydrogen will be used will see significant improvement, but the overall ecology of the planet will go downhill ever faster. A question arises – what's the point?

Often experts proclaim dreamily – ***"if only streams of ready hydrogen were to emanate from the depths of the planet – then everything could be restructured quickly. But (they add immediately) – that is not possible because it is simply impossible, to our great disappointment"***.

Streams of Hydrogen from the Depths of the Planet

Dear reader, you will laugh hard, but we, the authors of this article, have discovered those streams of hydrogen. Today we are ready to argue that this phenomenon is present on the Russian platform on a grandiose scale. But let's start at the beginning.

Over the course of the last 17 years, numerous cases of crater formations have been noted in the central European parts of Russia. There are two types of craters – explosion craters and depression craters. Depression craters appear to be a well known and well studied phenomenon: It has to do with the formation of karst cavities (caves) in limestone which constitutes several hundreds meters of the sedimentary crust of the Russian platform. Explosion craters, however, constitute a mysterious and unexplained phenomenon.

Sometimes the processes that accompany the formation of explosion craters are quite impressive. For example, on April 12, 1991, a powerful explosion rocked the town of Sasovo (located in the south-east of the Ryazan region). Doors and windows were blown out by the shock wave in half the houses. According to experts, damage of such proportions could have been caused by a shock wave produced by an explosion of at least several tens of tons of TNT. But no traces of explosives were uncovered. At a distance of about 700 meters from the city limits, in the floodplain of the river Tsna a crater was discovered; its diameter was 28 meters and its depth - 4 meters.

In June of 1992, another crater appeared in a cornfield 7 km north of Sasovo. Its diameter was 12 meters, its depth – 4 meters. This time nobody heard the explosion but the crater was not there when the field was planted. The explosive character of the crater was determined based on a ring shaped ejection encircling the crater, in a shape of a roll. Additionally, according to testimony of witnesses who observed the crater in its fresh form, chunks and pieces of soil were scattered around it.

We have long suspected that the formation of those craters is somehow related to hydrogen degasification of the planet. We came across an opportunity to investigate our suspicions. Some talented Russian physicists have invented unique **hydrogen gas analyzers**, which are capable of measuring the content of free hydrogen in a gaseous mixture in the range of concentrations between 1 **ppm** and 15,000 **ppm** (**ppm = parts per million**; 15000 **ppm = 1.5%**).

We paid a visit to the Sasovo craters in August 2005. We invited Dr. Vladimir Syvorotkin to come with us; Dr. Syvorotkin is a doctor of geology and mineralogy who has had previous experience working with the hydrogen gas analyzers and he happily agreed to familiarize us with his method of “hydrogenometrics”.

Measurements in the Sasovo area revealed the presence of free hydrogen in the subsoil air. Unfortunately, at the time of our visit, the crater (the one located in the floodplain, near the damaged city) has turned into a small lake, thus no measurements were taken inside the crater itself. However, both in the immediate vicinity of the crater, and at a distance of several hundreds meters, the presence of hydrogen in the subsoil air was established. The observed concentrations were unusually high, which surprised Dr. Syvorotkin, and pleased us. The

second crater was intact and completely dry; measurements at the bottom of it showed a hydrogen concentration that was double the concentrations in the nearby lying areas.



Picture 2: Dr. Syvorotkin and his son near the Sasovo crater. August 2005.

We were very pleased by the possibility of obtaining results right on the site. You drill a hole in the soil, stick a pipe in it, and pump the subsoil air into the analyzer and in 2-3 minutes read the result from the display. We purchased three hydrogen gas analyzers (ranges of measured concentrations: 1-100 ppm, 10-1000 ppm and 100-15000 ppm); perfected the process of sampling the subsoil air according to our purposes, and undertook several expeditions to the central areas of the Russian platform in 2006-2008.

We carefully studied a depression crater located in the northeast of the Lipetsk region, on an agricultural chernozem (black soil) field. It had a diameter of 14 meters, a depth of 4.5 meters. There were no ejections around it. The locals have discovered the crater in the spring of 2003. The drilling we performed has revealed lumps of fat chernozem in the sands of Cretaceous age at the depth of 3 meters (below the bottom of the crater). These lumps have fallen there from the surface, which clearly reaffirms the crater's depressive nature.



Picture 3: V. Larin near the depression crater in the Lipetsk region. Fall 2006.

Measurements at the bottom of the crater showed zero hydrogen. At a distance of 50 meters west and further, the first (most sensitive) analyzer started showing hydrogen concentrations of several ppm, but no more than 5 ppm. But at a distance of 120 meters, it “drowned” in hydrogen. The second analyzer showed a concentration of 100 ppm in the same spot. Detailing this site revealed the presence of a local hydrogen anomaly that stretches horizontally for 120 meters and has a width of 10-15 meters, with maximum concentrations of 500-600 ppm.

About Some Properties of Hydrogen

One of the distinguishing characteristics of hydrogen is its unique ability to diffuse in solids at a speed, which is significantly (several times) higher than that of other gases. In this

regard we have no reason to believe that we have identified a local anomaly that is buried and has been left (preserved) from ancient geological times. Rather, it is most likely that we have discovered a point of exit of a modern hydrogen stream to the surface.

Geological experience teaches us: if Earth phenomena are closely linked in space and time (in our case - *depression crater* and *hydrogen stream*), it is likely that they are also linked genetically, i.e. are derivatives of the same process. Such a process, apparently, is the hydrogen degasification of Earth.

Hydrogen (literally – “bearing water”) is a chemically active element. In the upper portions of the Earth crust there is a lot of free oxygen buried in the pores and cracks between the rocks, as well as weakly chemically bound oxygen (predominantly in the form of oxides and hydroxides of iron). When the endogenous stream of hydrogen is making its way up to the surface, it is certain that it is being used up for water formation. And if the stream actually reaches the surface, we can be sure that it is much more powerful in the depths of the crust; accordingly we should assume that there are inner-earth (endogenous) processes going on that we, the ones living on the surface, should take into consideration.

First of all, the underlying fluid streams are never made up of only hydrogen. They always include chlorine, sulfur, fluorine and other elements. We know this based on other regions where the degasification has been taking place for a while. These elements are present in the water-hydrogen fluid in the form of various compounds, including in the form of acids (HCl, HF, H₂S). Thus the hydrogen stream forms acidified water at the depths of the first few kilometers, which, in addition, must possess an elevated temperature (due to the geothermal gradient and the heat associated with the chemical reactions). Such water “eats up” the carbonates very quickly.

There are hundreds of meters of carbonates in the sedimentary crust of the Russian platform. Traditionally we are accustomed to thinking that the formation of karst cavities in the crust – is a slow process, because we typically associate it with the seepage of rain and snow waters into the depths; these waters are practically distilled and also cold. Their ability to dissolve anything is very small. The discovery of a hydrogen stream (and a fresh depression crater next to it) forces us to update our customary views. Acidified hot water which forms en route of the hydrogen stream has the capacity to “eat out” the crust very quickly, form karst cavities and thus provoke the appearance of depressions on the surface of the Earth (when we use the word “quickly”, we are not referring to the geological time, instead we are referring to our, human, fast flowing time). Below we will discuss the scale of this phenomenon further.

Mysteries of the Sasovo Explosion

Now let's return to the explosion crater near the town of Sasovo. A lot of mystery is surrounding it. The explosion occurred on the night of April 12, 1991, at 1:34 am. However, four hours earlier (on the late night of April 11), large (huge, according to witnesses) glowing spheres

began floating around in the area of the future explosion. One such sphere, bright white in color, was seen above the railroad station. The sphere was seen by the railroad employees, numerous passengers, and the locomotive driver (who raised the alarm). The unusual phenomena in the sky were seen by the students of the flying school of civil aviation, the railway workers, and the fishermen. An hour before the explosion, an odd glow was spreading above the surface of the future crater. Half an hour before the explosion, locals living in the outlying areas of town, saw two bright-red spheres above the site of the future explosion. At the same time, people felt the earth shaking and heard an underground buzzing. Right before the explosion, the inhabitants of nearby villages saw two bright-blue flashes that lit up the sky above the town.

The powerful explosion was preceded by an intensifying buzz. The earth started shaking, the walls started shaking, and only then a shock wave (or waves?) hit the town. Houses began swinging from side to side, televisions and furniture fell over, chandeliers were broken to pieces. Sleepy people were thrown off their beds and covered in broken glass. Thousands of doors and windows, as well as roof sheets were torn off at the root. Due to incredible pressure fluctuations, manhole covers were blown off; hollow objects were bursting – sealed jars, light bulbs, and even children’s toys. Underground – sewage pipes were bursting. When the roar stopped, the shocked people heard buzzing again, but this time it seemed to be receding...

All this is not like an ordinary explosion. Explosives specialists estimate that in order to do such damage to the town, no less than 30 tons of TNT had to have blown up.

But why, then, such a small crater? Just one ton of TNT is enough to produce a crater that size (V. Larin is saying this, who is concurrently an explosives specialist with many years of experience; after seasons in the field he had to detonate 1.5-2 tons of explosives because the warehouse won’t take them back).

It seems also very odd that in the immediate vicinity of the crater the grass, shrubs and trees remained intact (not damaged by neither the shock nor the high temperature). The poles standing nearby were tilted towards the crater? And why were the manhole covers blown off, and what was the reason for the bursting of the hollow objects?

And finally, why did the “explosion” appear to be stretched over time and preceded by buzzing, earth shaking and the unusual lighting phenomena (apart from the glowing spheres and bright flashes, which were observed before the explosion, the crater itself glowed in the dark at night, until it was filled with water).

The reason behind the mysterious “attack” on the town remained unknown. Specialists came to the conclusion that neither humans, nor nature were capable of such a thing. This conclusion was a generous gift to UFO researchers, who had a feast with it.

Now here is our version. We know that in the middle parts of Russia there is a possibility for local hydrogen streams. These streams are accompanied by the formation of hot

water, which is also highly mineralized. When thermal mineralized water enters a zone of lower temperature and pressure, it releases its minerals in the form of various “hydrothermalites”, while filling in the existing system of permeable pores and cracks. As a result, the hydrogen stream in the upper regions of the crust may form a kind of dense “cap” around itself, thus blocking the hydrogen’s way out to the surface. This barrier causes the accumulation of hydrogen and other gases in a certain volume (in a “boiler”) under the cap, thus leading to a sharp increase in pressure. ***(Bubbles of gas that pop up from great depth in a poorly compressible liquid, lead to the increase in pressure in the upper portion of the system filled with this liquid)***. When the pressure in the boiler reaches a certain point, a bursting of the cap and the above soil occurs. And we get a massive ejection. The contents of this ejection are primarily hydrogen and water. In this way, the Sasovo crater was formed not by an explosion, but by a bursting of a gaseous stream, consisting mainly of hydrogen; that’s why it (the crater) is so small *(at great speeds, gaseous steams preserve their diameter, and when hitting the exit, they even separate from the walls)*.

The explosion itself occurred in the atmosphere where the hydrogen steam mixed with oxygen and created a cloud of explosive gas, which in its turn exploded, i.e., this was a massive explosion. A large amount of heat was released which lead to a sharp increase (explosive dispersion) of the products of the reaction. When explosions of such great volume occur, a zone of dilution (with lower pressure) forms behind the front of the shock wave. The same effect can be seen in explosions of the so-called “thermobaric bombs”. We ought to note that when explosives specialists studied the Sasovo event, they noted that many things (ripped off metal manhole covers, bursting of hollow objects, burst doors and windows...) pointed to an explosion of the thermobaric type. But the military insisted that an explosion of a “thermobaric bomb” must be excluded as a possible cause of the event. Still, the area was combed with the latest metal detectors, but no fragments of a bombshell were found.

It is interesting to note the results of calculating the possible size of the underground boiler with the following parameters:

- The “boiler” was 600 meters below the surface, where the pressure was 150 kg/cm²;
- It had a volume in which there was only 5% porosity in the form of interconnected cavities;
- The interconnected cavities were filled with hydrogen under the pressure of 150 atm;
- Only one twentieth portion of the ejected gas exploded; everything else got disbursed in the atmosphere;
- The portion that exploded emitted the amount of energy equal to the explosion of 30 tons of TNT.

Under these parameters, the volume of the “boiler” could have been approximately 30 x 30 x 50 meters.

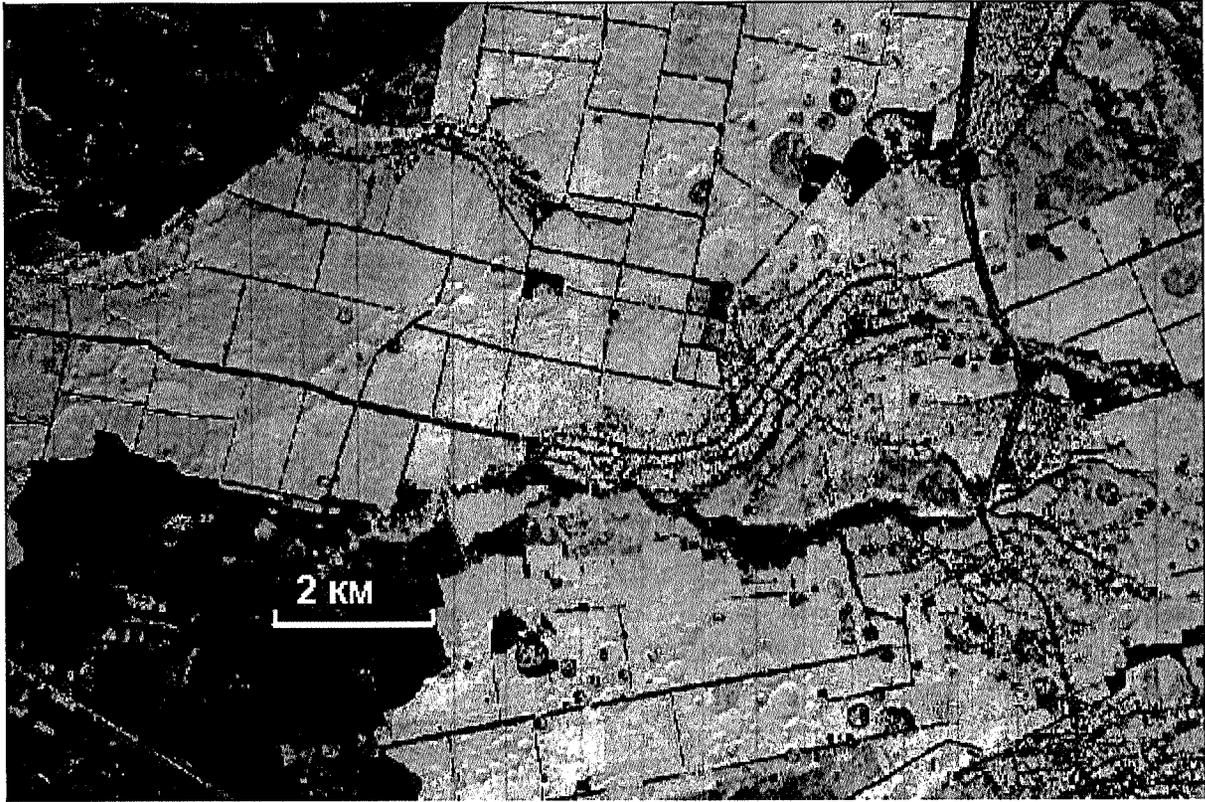
Thus, the boiler was miniature on a geological scale. But the energy accumulated in it was thousands of times greater than the energy in the boilers of thermal power plants. There is a thermal power plant within approximately one kilometer of my building; when they are releasing pressure in that boiler – I go deaf and the windows in my apartment start vibrating. Now try to imagine what the buzzing and the vibration would be like if near your house there

was an underground boiler, thousands of times more powerful - and it gave a crack, and its contents were rushing out, making their way through a 600 meter layer of rock. It would seem like a powerful earthquake accompanied by a strong underground buzzing.

Now let's talk about the mysterious lighting phenomena. Strong electrification in the region of an upcoming earthquake is normal: the hair stands up on ends, the clothing ridges and crackles; everything you touch strikes with sparks of static electricity. And if this takes place at night – you start glowing. A dry handkerchief can fly away just like a magical flying carpet. This phenomenon is beautiful, but somewhat terrifying at the same time (you never know how hard the quake will hit). Many seismic shocks are accompanied by the appearance of glowing spheres (especially near the epicenter). Some researchers call them “plasmoids”; but giving an entity a name does not mean understanding its nature – the true nature of these phenomena is yet to be determined.

During the famous 1966 earthquake in Tashkent (Uzbekistan), the main shocks came at night. At the first signs, the local authorities immediately turned off the city's electric supply. However, even with the electricity unplugged, some streetlights lit up by themselves and remained lit during the seismic shock and for 10-15 minutes afterwards. The official report on Tashkent's earthquake talks about dark cellars (which had no electrical lighting at all), which lit up and you could see in them just like in broad daylight. Some theories were postulated that the electrification and the lighting effects had something to do with the accumulation of charged states in the rocks.

Thus, if a hydrogen stream gets «locked up» deep underground, it may cause the formation of a crater as a result of a breakthrough of the gases to the surface of the Earth. And perhaps this breakthrough is not always accompanied by a voluminous (thermobaric) explosion in the atmosphere. If, however, the hydrogen stream reaches the surface smoothly, we get a depression (karst) crater. Apparently, those variations are due to the differences in the physical and chemical properties of the rocks through which the hydrogen infiltration takes place.



Picture 4: A photo made from space in the winter. The pictured territory is located 20 km south of Lipetsk. The dark areas are the forest. The light areas are fields covered with snow and separated by forest-protective barriers. The black dots are towns. This exposure under the low winter sun makes the craters particularly visible. We are at a loss of words to express the surprise at the revealed picture. And this is by far not the only place with such high density of craters.

In places, the amount of craters baffles the imagination (see picture 4). Among them we come across structures with diameters of many hundreds of meters and even kilometers. In many cases we can see that inside those large craters there is no trace of collapses or breakthroughs, and the soil layer is undisturbed. This observation leads us to think that besides depression and explosion craters, there exists another type of structures; we shall talk about it in more detail after we discuss the existence of regional hydrogen anomalies.

The “Dacha” Anomaly

Taking trips to the central chernozem region is a pleasurable thing, especially early in the fall, when it's harvest time, there aren't too many mosquitoes and the weather is still nice. But at the same time, these trips are onerous because of the need to ride in a heavy SUV with tractor treads on the wheels (otherwise the region is useless in the wet weather). Additionally, the trips are tiring because of single lane roads, filled with slow-crawling cargo transport. So, every time we were once again stuck in traffic, we would dream – "how great would it be if we discovered a hydrogen anomaly right in our dacha", to which it only takes one hour to get to via the highway from an apartment in Moscow. At the dacha there is a shower, a sauna, bad weather can be waited out by the fireplace; but once the rain is gone – you can start working right away.

During the next routine trip to the dacha we tested for hydrogen right on our property. We got a reading of over **500 ppm**. We started measuring all around; first within meters, then within tens of meters, then hundreds of meters and finally within kilometers. Everywhere the reading was hundreds of **ppm**; and every fourth reading was above **1000 ppm**. Currently we established that there is a regional anomaly in the Moscow region; its length from south to north is at least 200 kilometers; its width at least 100 km. We still have not determined its exact contours and we suspect that it is larger because some peripheral measurements showed values of above **1000 ppm**. This anomaly covers the entire city of Moscow.

New Data

Everything written above is based on work that was performed in 2005 and 2006. In the following years we continued our research and we can report to you, dear reader, that hydrogen degasification has not stopped, instead it has a clear tendency to grow. It expands onto new territories, and clearly becomes more intensive. Two years ago we were quite satisfied using instruments that were capable of measuring concentrations of up to 1000 *ppm* (up to 0.1%). Nowadays, in the spring of 2008, we rarely turn those on, because we encounter concentrations of 1% and higher. Our most "insensitive" instrument has a scale of up to 1.6% (up to 16,000 *ppm*); but this year even this device has been "drowning" in hydrogen in places. Those *places* include even our *control points*, where no such *off the scale* concentrations were previously seen.

Previously we distinguished between two types of craters: *depression* craters and *explosion* craters. Now we ought to add another type of structures to this list: the so called "ring depression structures". These types of structures are particularly well defined in images taken from space: they look like light-colored rings and circles, located in exit points of hydrogen streams and jets. They are particularly prominent in the chernozem region. We performed manual drilling in order to establish the reason for this color change. We discovered that *hydrogen degasification destroys the organic humus* (the most valuable component of chernozem). The soil's color fades to grey and even light-grey. Obviously this is accompanied by the reduction in the soil's productivity. Additionally, we got the impression that hydrogen has

a destructive effect on the living flora directly. Trees and undergrowth die in areas where hydrogen streams are exiting the ground; in places even the grass stops growing. But we will leave the investigation of this problem to the appropriate specialists – biologists.

Now we would like to follow the proverb *“a picture is worth a thousand words”*, and show a series of pictures that illustrate the scale of hydrogen degasification and the variety of structures associated with it. When we explain the pictures, we use the term “hydrogen bleaching”. As mentioned above, this is due to the destruction of humus in the chernozem. Humus is composed of long, complex organic structures (molecules). Their length is determined by chemical bonds between carbon atoms. But when these molecules encounter a hydrogen stream, hydrogen atoms incorporate themselves between the carbon atoms, causing the long molecules to break down. The smaller molecules turn out to be volatile gases and evaporate. Additionally, we found white sand under the soil layer in areas of hydrogen stream exits. The sands are white because of the appearance of white clay (kaolin). This is the result of the impact of hydrogen on the grains of feldspar - they get coated with a thin white film.



Picture 5: A forest (on the left) and a chernozem field in the north-eastern suburb of Lipetsk. The arrows point to the ring-shaped structures. The rings are 100 to 250 meters in diameter. The depression of soil in the rings is no more than 4-5 meters. In these structures there is no sign of a “clay crust” on the bottom. That is surprising, because just a few torrential rains is all that’s needed in order to wash away the dust from the rims and for the muddy water to accumulate at the bottom of the ring. When the water evaporates, you would expect to see a

clay crust. Since there is no such crust, but the soil depression is present (and there is no drainage from the structure), we must conclude that the depression of soil in this spot took place very recently (“recently” on the scale of human, real time).



Picture 6: We are looking south. Right in front of us is a ring structure (the top structure from picture 5). A “dark pole” on the field (a little bit to the right of the center) – is V. Larin; height – 175 cm. The next ring structure can be distinguished behind the pole (to the right and further). If one didn’t know how this area looks from space, one would never guess that active geological processes are taking place here; ring depression structures form “right in front of one’s eyes”, caused by hydrogen degasification from the depths of the planet.



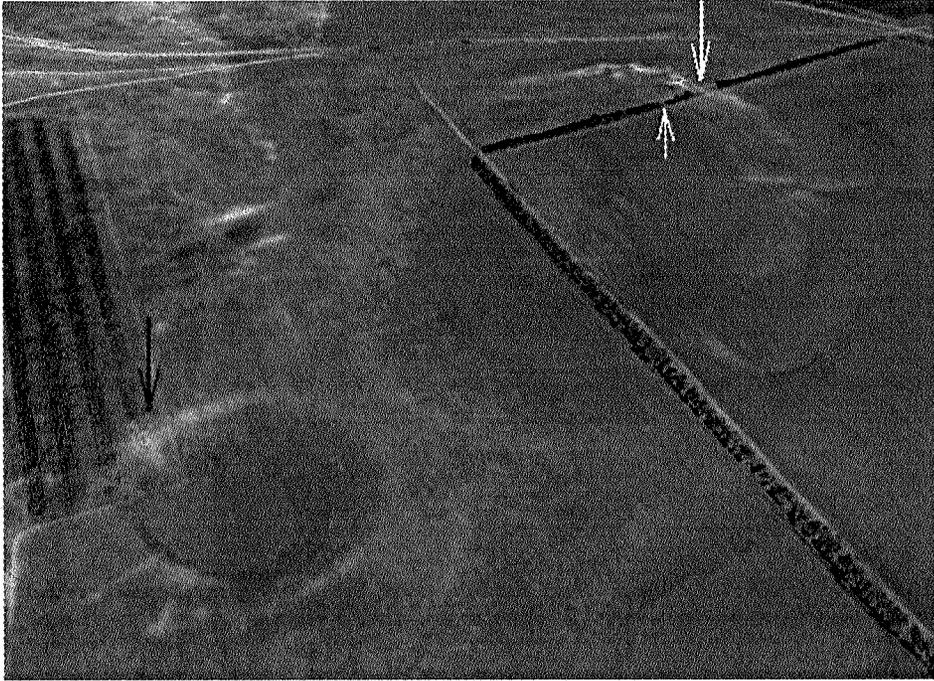
Picture 7: An example of a large ring structure in the early stage of its formation. The ring diameter is 2 km. (Northwest Volgograd region).



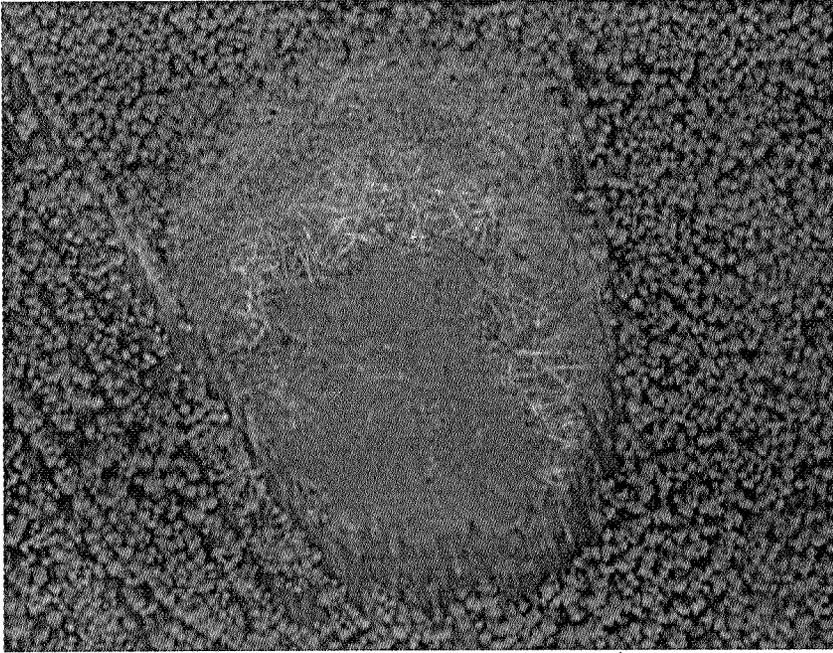
Picture 8: The next stage of ring structure formation: the diameter of this one is 2.5 km. Soil depression in the center is particularly prominent here. As a result, a “swamp ulcer” has formed on the chernozem valley. (East Voronezh region).



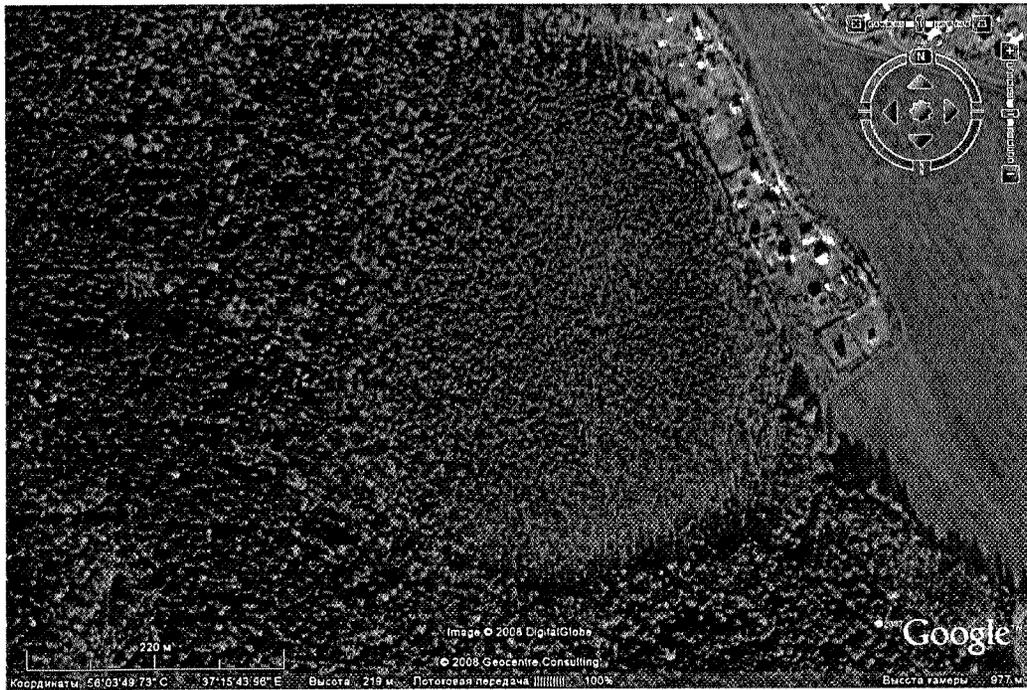
Picture 9: Further development of a ring structure. A swamp has spread over almost all of the ring structure. Meanwhile hydrogen continues to seep through beyond the borders of the initial ring (which is still visible), and it started “bleaching” the surroundings. (East Voronezh region).



Picture 10: Here we look at an angle of 45° to the surface of the Earth. The size of the larger ring is $840 \times 600\text{m}$; the diameter of the smaller one is 300m . On this picture we can see well how hydrogen destroys forest plantations. The trees in this area have died just recently. The red arrow points to a spot where young trees of the plantation have been growing "carelessly" for a few years, until a "hydrogen beast" came and destroyed them. This obviously points to the expansion of hydrogen degasification; today it takes over newer and newer territories.



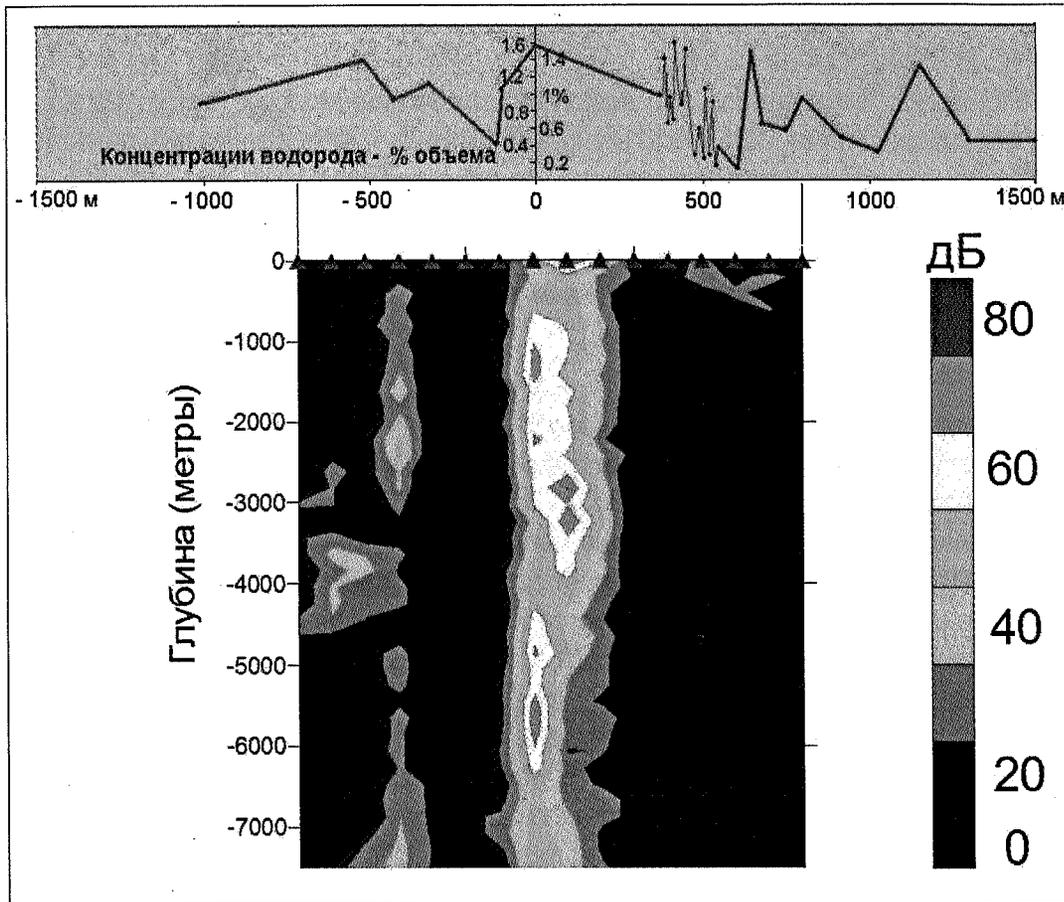
Picture 11: Moscow region; 1.5 km southeast of the town of Electrostal. A young ring depression structure among the forest mass (measures 220x170m). Brown hues in the center are a swamp; the “gray felt” is fallen trees; green rim – alder forest; the “dark crescent”-shaped bottom - the shade of the surrounding trees.



Picture 12: A mature ring depression structure in the Moscow region. (22 km north-north-west of the intersection of MKAD and Leningrad Highway). This was an old, predominantly spruce forest that has gotten destroyed; the structure got depressed and swampy, and taken over by pines. The pines' age, at first glance is no more than 15-17 years. However we did some cutting down, counted the rings and were surprised – these trees are 65-70 years old. Imagine a 70-year-old tree with a thickness of 10 cm at the bottom.

Depression structures, like the one on Picture 12, are widespread in the northern part of the Moscow region. There are even more places where they are about to appear. Thus we were curious to check - do those entities really originate from the depths of the planet? Maybe those are just ordinary swamps in which organic matter is decomposing thus causing the emission of hydrogen? This was a version that our inner skeptics whispered to us periodically; the ones that love to come out during times of forced boredom due to bad weather. In order to calm those pesky types, we called upon a talented geophysicist Andrei Gorbatikov who has developed a unique method for “microseismic sensing”, to collaborate with us. A latitudinal profile 1.5 km long (16 stations every 100 meters) revealed a vertical zone underneath the depression structure (a “pipe”, 350 meters in diameter), which goes down for more than 6 kilometers (see picture 13). Inside this “pipe”, a sharp uptake of microseismic waves takes place and the speed of sound passage is reduced. Conclusion: most likely, this area is riddled with pores and caverns, which are filled with liquid and gas.

Numerous hydrogen concentration measurements in this area revealed a massive anomaly, which goes beyond our profile. At the center of this anomaly (where the depression structure is located), hydrogen concentrations exceed 1.6%; on the periphery the concentrations drop (sporadically) to about 0.5%, which is also rather large.



Picture 13: the results of “microseismic sensing” and hydrogenometrics (in subsoil air) through the latitudinal profile of the ring depression structure on picture 12. On this plan, the pipe-like zone overlaps the ring structure precisely. The color scale reflects the varying degrees of microseismic waves absorption in decibels (the brighter the color – the fuller the absorption).

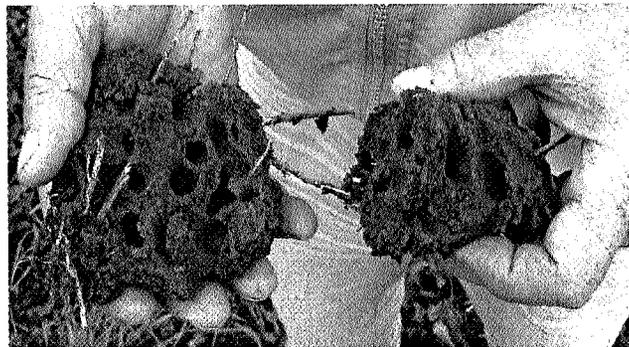
Inside this depression structure the surface is flat; there is no tree debris (like on the rims), and it is dry – one can walk without rain boots. Among the soft moss, ledum plants, lingonberries and blueberries are growing. It is an attractive scenery. But if you find a field without trees and jump on it, you can see clearly how waves spread away from you across the surface. You get a feeling like you are jumping on a “soft blanket” and underneath you is some kind of “*liquefied mass*”. My young colleagues (Andrei and Larin Junior) also noticed this and what they came up with! One of them will jump, while the other will catch the “echo” coming from underground. They decided – Larin will jump (he is a geologist and an athlete), while Andrei, since he is the geophysicist, will be the “echo-catcher”. They played this game, and in the evening, at the end of the day of hard work, they were assuring me (Larin Senior) that the echo comes back after a quarter of a second. This means that underneath this “soft blanket” there is a pit filled with some “liquefied mass”, and this pit is about 180 meters deep. It is

amazing how creative a person can be when he comes across something unusual, but has limited resources. Later on, we still measured the time it takes the reflected wave to come back using super modern apparatus, and the time turned out to be just 0.05 seconds less – meaning that the pit is about 150 meters deep.

We used a special sensor to puncture the “blanket” and without much effort lowered the sensor 7 meters down into the “mass”. Then we pulled it out (this time forcefully), examined it closely, and didn’t find any signs of mineral soil (clay or sand). But a pleasant smell spread around, which we dubbed - “*natural freshness*”. What an odd swamp. However we wouldn’t want to be among construction workers, pulling a road across this structure, or among a tank crew that decided to pass on a level field through the woodlands.

While we were working on this structure, we listened to lots of complaints of the locals whose houses are located in close proximity to the depression structure (see picture 12). Mostly they complained about the “at times unbearable” hydrogen sulfide smell and about “dead bald spots” in their gardens on which absolutely nothing grows. Knowing the reason for those troubles we felt for them, but refrained from telling them that it will only get worse.

Two years ago our old friend and colleague S.M. Beskin (doctor of geology and mineralogy) showed us a rather unusual phenomenon in south Moscow region: many fields were densely covered with miniature “mud volcanoes”.



Picture 14: On the left – a dissected “mud volcano”; height – 0.5 meters. Cavities from “gas bubbles” take up 40-50% of the volume; the bubble walls are for some reason amazingly smooth and dense.

Our measurements show that this phenomenon appears in areas of hydrogen degasification. At first we thought that the reason for this is some characteristic of the local soil, which prevents the free exit of hydrogen and makes it accumulate in the form of bubbles. But in the spring of 2008 this phenomenon spread widely across the entire Moscow region.



Picture 15: Moscow region, Dmitrov district, April 2008. By spring, the field south of the village "Svistukha", was covered with the boils of "mud volcanoes". This has not been seen previously. V. Larin is standing in the middle and he is not at all pleased with what he is seeing.

In late April 2008 we reported the new data on Earth degasification, and demonstrated pictures of "mud volcanoes" at the Russian National Convention on Earth Degasification in Moscow. It turned out that many attendees of the convention saw the same thing on their way to the capital in other European parts of Russia; they saw it and were surprised because they could not recall seeing this phenomenon in previous years. Thus it is evident that hydrogen degasification can now be observed by anybody willing to do so, which points to the obvious expansion of the process. We - the authors are not pleased, because knowing the reason and having observed the dynamics of the process, we can imagine very well the rapid negative consequences.



Picture 16: circles, rings and hydrogen bleaching in the northwest part of Volgograd region. The area of such zones, affected by hydrogen bleaching, is measured in hundreds of square kilometers. This shows the scale of the phenomenon.

So When Did Hydrogen Degasification Begin on the Russian Platform?

This can be determined based on the age of the craters and the ring structures, which are genetically related to hydrogen degasification. Among them, there are very young ones - their formation happened and is happening right in front of the eyes of the observers. But there are old ones – “prehistoric”. People did not see and do not remember their formation (i.e. they are over a thousand years old). From the geological point of view, their age is also modern

Thus, the concentration in the hydrogen stream was (at least) several times higher. But, we can work with such concentrations.

Secondly, hydrogen is the main component (based on the number of atoms) of oil and natural gas. And in this regard, the problem of the origins of hydrocarbons is reduced to the problem of hydrogen source. There is more than enough free carbon in the Earth's crust. And if hydrogen streams are passing through it, hydrocarbons must be generated. Simultaneously, a system of pores and caverns is forming not only in limestone, but also in silicate rocks – in granite and granite-gneisses. These pores and caverns are filled with the newly formed oil and thus rich deposits are created. We believe that the upper kilometers of the most “mature” hydrogen plumbing, may carry some uniquely large stocks of oil.

Thirdly, in our understanding, oil and gas form only when hydrogen degasification is taking place from within the deep zones of the planet. And if hydrogen degasification is taking place right now, then oil and gas are also being generated today and will continue to be generated tomorrow (we are referring to the time scale relevant to human civilization). Thus, the hydrocarbon fuel sources that we are using, most likely continue to be replenished today. It is often the case that an oil deposit is discovered, exploited, the estimated amount is completely used up, but oil continues to flow. In this regard, boreholes that had been exploited should be sealed off, in the hope that they will recover in the near future. I (Larin Senior) published this projection in 1992, but I didn't have much hope to live long enough to see its confirmation on facts. However, in recent years some sensational reports began to appear about old, exploited deposits filling up again.

Thus, the experts' understanding on the complete exhaustion of oil and gas resources (ostensibly non-renewable) by the 40's of this century appear to be like “scary stories for kids”. In light of the hydrogen degasification of Earth that we discovered, these resources are not only renewable but there is also a lot more of them than is believed to be; so energy hunger is not a threat in our nearest future.

Some countries, scared off by the prediction of an imminent exhaustion of hydrocarbon resources, store and don't exploit their oil fields, believing that that is the wise thing to do. However, we can revise this policy based on the hydrogen degasification that we discovered in the tectonically quiet regions and the fact of replenishing of exploited oil reserves. In all likelihood, it would be prudent to put these reserves at least in a «soft» mode of exploitation, in order to see what happens.

Minuses

- **First.** Let us review the reasons and the mechanism of the Sasovo explosion: it occurred as a result of a hydrogen stream bursting to the surface; it mixed with the atmospheric oxygen, a cloud of “explosive gas” formed, and as a result a thermobaric explosion happened, equal in magnitude to an explosion of 30-50 tons of TNT. Two years ago we thought that this was a rare occurrence (exceptional and unlikely). But now, when we see the extent of hydrogen degasification, when our instruments, more and more, show readings off the scale, thus indicating that hydrogen concentration at the depth of just one meter is measured in percents (an “explosive gas” – is 4% and higher) – now we have a completely different estimation on the likelihood of events of this kind. Now we have to admit that thermobaric explosions, like the Sasovo one, may become an ordinary event in the near future. Moreover, these future explosions may be much more powerful - tens and hundreds of times more powerful, which is comparable with tactical nuclear weapons. Now imagine, what would happen if such an explosion happened in a densely populated region, or above a mega polis?
- **Second.** Today, in many places, the measured hydrogen concentration reaches 1.5-1.7%. However, when we take a sample of the subsoil gas, we cannot discount the mixing in of the atmospheric air, which is practically devoid of hydrogen. When we take this dilution into account, the real hydrogen concentration in the subsoil air could be reaching 2.5-3%. Technologists are very familiar with a phenomenon of *catastrophically brittle* metals, which occurs when metals are exposed to such a gaseous mixture for prolonged periods of time (months). As a result, underground metal structures and communications can become so fragile that they will crumble from their own weight of their engineering facilities, or at the movement of the soil, even a very minor one. So far, during the design and construction of facilities, the destruction of which could have catastrophic consequences, the possibility of hydrogen embrittlement of metals is not taken into account. However, hydrogen degasification has been detected, it tends to increase (in terms of areas affected), and this factor must be taken into account.
- **Third.** According to the Moscow geo-ecologists (who do not yet have the data about the hydrogen streams), 15% of the city territory is located in zones that are at risk for karst failures; collapses in these areas can occur at any time. Specialists know about it, they talk and warn, but they have not been particularly active in forcing the authorities to take appropriate measures. Apparently, a calming factor here is the prevailing view that karst cavities “take their time” in forming. But in our scenario, when hydrogen is “at work” (and it can “work” quickly), this threat must be taken with high priority.
 If we could have our way, we would halt the construction of multistory buildings right now (even before clarifying the situation deep underneath the mega polis). They have too big of an impact on the underlying horizons. And if there are hydrogen streams in the city limits (and there are), able to produce water (“warm” and chemically aggressive water), this water, first of all, will erode the rock in tension, i.e. it will erode the rock underneath the foundations of skyscrapers. And there is no need to blame the high-rise buildings from the Stalin era, which have been standing for half a century. First, they were built differently; and second – hydrogen degasification has likely been gaining momentum over time. And now the mass media are full of reports about ground collapses in Moscow. It seems that this hasn’t been the case before.

Conclusion

Dear readers – regrettably, all what was said above is not a leisurely fiction; regrettably, all what was said – is the reality, it is all based on real facts. Delaying the initiation of extensive studies of the problem may be a “death sentence”, in a literal sense. However, if we hurry, we can still turn hydrogen degasification to our favor; we can save what can be saved, and we can save ourselves from the coming scourge.

P.S. When first acquainted with our data, many people ask – *“Why such a large scale phenomenon is only now being discovered? Was it not happening 25-30 years ago?”*

Of course it was happening; 30 years ago degasification was happening, albeit maybe not as intensively as it is now. The ring depression structures were in existence too, but there were fewer of them; as there was less “hydrogen bleaching” of chernozem soils. But the reason is not lack of evidence – it is something different. Within the prevailing perceptions (of the composition and structure of the planet) there should not be hydrogen degasification on the ancient platform. And who is going to look for something, which (in terms of the widely accepted “common sense”) – cannot be in principle in the first place? That’s why nobody looked. But we (the authors of this text) have been working for a long time within a new global geological concept, according to which there must be degasification of deep source hydrogen. As soon as hydrogen analyzers suitable for fieldwork became available, we purchased them and went to look for hydrogen streams on the Russian plains. We found them right away, but we must admit – at first we did not even suspect, what would be the real extent of this phenomenon.

V.N. Larin – doctor of geology and mineralogy

From: Bill Waite [mailto:BWaite@aegistg.com]

Sent: Monday, July 27, 2009 5:26 PM

To: Stine, Deborah D.

Cc: Charlotte Sallas

Subject: Attendance at Sept 09 PCAST Meeting - Statement Modeling and Simulation as National Critical Technology

Dear Dr. Stein:

I would be honored to have the opportunity to present to the President's Council of Advisors on Science and Technology (PCAST), in person, on either 6 or 7 August 2009, a statement with the following content, on behalf of the nation's modeling and simulation community-of-practice:

1. Modeling and Simulation:
 - a. Is a "National Critical Technology" (as per HR-487 2007).
 - b. Is fundamental to progress in many areas of national need including: energy, environment, health and biotech, education, transportation, economics, defense, etc., (as per "M&S Leadership Summit 2008", conducted by NTSA, www.trainingsystems.org, in cooperation with the Congressional Modeling and Simulation Caucus, <http://forbes.house.gov/Biography/MSCaucus.htm>, and as was supported by Dr. Charles Romine OSTP, Technology Division);
 - c. Is a technical capability widely evident across the nation (as per "M&S Leadership Summit 2009", *ibid.*);
 - d. Has potential to contribute materially, ecumenically, and transferably to the national technical infrastructure and economic recovery (as per "Simulation-Based Engineering Science – Revolutionizing Engineering Science Through Simulation" May 2006, National Science Foundation (NSF), http://www.nsf.gov/pubs/reports/sbes_final_report.pdf); and
 - e. Is an industry that serves as an engine of prosperity in times of considerable economic challenge (as per http://www.nytimes.com/2009/06/14/jobs/14starts.html?_r=1&scp=1&sq=In%20Simulation%20Work,%20the%20Demand%20is%20Real%20&st=cse.)
2. Nevertheless:
 - a. No practical means exists whereby components of the national society, let alone government executive departments can collaborate broadly and systematically on fundamentals of M&S research, workforce development, industrial development, and investment; and
 - b. No North American Industrial Classification System (NAICS) code exists whereby the nation may account for the value of modeling and simulation products and services; and whereby the federal government and private sector may identify centers of commercial modeling and simulation expertise, supply, and demand.
3. Therefore, on behalf of the United States modeling and simulation community-of-practice, we request that PCAST:
 - a. Review the relevance of computer modeling and simulation technology to the needs of the nation and the science and technology agenda of the executive branch;
 - b. Publish determinations and findings regarding:
 - i. Opportunities to leverage emerging modeling and simulation technology in pursuit of the nation's challenges in health, education, energy, infrastructure, economy, and security;

- ii. Means whereby to influence the constructive identification and pursuit of a national research agenda for modeling and simulation calculated to facilitate those opportunities;
 - iii. Appropriateness of explicit inclusion of modeling and simulation into the topical agenda of the OSTP and for which national policy positions may be effectively pursued;
 - iv. Expectations for recovery of investment (ROI) in prospective coordination of modeling and simulation across executive departments and socioeconomic application domains.
- b. Recommend, to the degree necessary and sufficient, ways and means whereby OSTP may achieve for the nation, through the efforts of the executive branch, the most cost-effective leverage of modeling and simulation in pursuit of the nation's challenges in health, education, energy, infrastructure, and security.

Regards,

William F. Waite
Executive Chairman, *SimSummit*
Member BOD, Modeling and Simulation Society International
Member, Congressional M&S Caucus Support Committee
Chairman BOD, Alabama Modeling and Simulation Council
Chairman BOD, and CTO The AEGIS Technologies Group, Inc.

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-----Original Message-----

From: David A. Wheeler [mailto:dwheeler@dwheeler.com]

Sent: Friday, July 31, 2009 6:14 PM

To: pcast@ostp.gov; Stine, Deborah D.

Cc: dwheeler@dwheeler.com

Subject: Written comments for PCAST

Dear Dr. Deborah D. Stine and all other members of PCAST:

Here are my written comments to PCAST; thank you for the opportunity to submit them. I am a U.S. citizen, and I have several substantive comments on PCAST's work topics. None of my comments (below) are for business marketing purposes.

I understand that PCAST is charged with advising the president about national strategies to nurture and sustain a culture of scientific and engineering innovation. Strong innovation requires the sharing of information in a cooperative, open manner. In recent years, this sharing has been hampered by excessive proprietary rights and secrecy. To encourage innovation in science and technology, I recommend the following:

1. Require public access of all research papers developed through government funding. They should be posted on the world-wide-web without charge or registration using open standards (such as PDF or HTML).

NIH is leading the way here (<http://publicaccess.nih.gov/>). "We the people" paid for the research, so "we the people" should receive the results.

2. By default, release as open source software (OSS) all research & development software funded by the U.S. government, unless the government makes a specific determination that it should not do so (e.g., because such release would harm national defense). Consider expanding this to all software developed by U.S. government funding.

Historically, developers gain essentially exclusive rights to software developed using government funds, leading to a hampering of innovation. Since open source software is commercial software, such releases are in fact a commercialization strategy. Red Hat (a vendor that focuses on supporting open source software) just became a member of the S&P 500. The Internet flourished in part because the government paid for the development of open source software implementations of its key protocols. But unlike older commercialization approaches, releasing as open source software lets ALL U.S. citizens enjoy the results of software whose development they paid for. (Indeed, it can be argued that ALL government-funded software should be so released by default.) In short, if "we the people" paid for development of such software, then by default "we the people" should receive it.

3. Eliminate software patents.

For many years, patents were not permitted on software, and software innovation flourished. However, recent rulings and interpretations have in essence permitted patents on software in the U.S., greatly hampering software innovation.

Software makers have attempted to innovate in spite of these interpretations, through various cross-licensing deals. Unfortunately, these can hamper small businesses (who are often where innovation flourishes), and the rise of "patent trolls" (who make nothing and thus do not need cross-licensing deals to make software) is beginning to harm even large organizations. The U.S. Federal Trade Commission (<http://www.ftc.gov/os/2003/10/innovationrpt.pdf>) found that many believe "software and Internet patents are impeding innovation... impairing follow-on incentives, increasing entry barriers, creating uncertainty that harms incentives to invest in innovation, and producing patent thickets". Bessen and Maskin demonstrated that as U.S. software patentability went up, software innovation went down (in contrast with the rest of industry) <http://www.researchoninnovation.org/patent.pdf>>. For more information, see <http://endsoftpatents.org/>>.

4. Shorten the copyright duration, and make it opt-in not opt-out.

The U.S. Constitution states that Congress is empowered "To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries". The limit on time is critical; innovators must build on other works, and the effort to gain rights on other works can impede or prevent new innovations. As Thomas Babbington Macaulay stated in a Feb. 5, 1841 speech to the House of Commons, "It is good that authors should be remunerated; and the least exceptionable way of remunerating them is by a monopoly. Yet monopoly is an evil. For the sake of the good we must submit to the evil; but the evil ought not to last a day longer than is necessary for the purpose of securing the good." http://www.apig.org.uk/index/APIG_DRM_Report-final.pdf>. Unfortunately, there is no longer any balance; copyright durations (originally 14 years with a renewal for 14 years) have been repeatedly extended far beyond what is justified by this clause. What is more, copyright is automatically granted (instead of requiring an affirmative label), making even ordinary actions technically illegal, and making rights-clearing nearly impossible.

Instead, shorten the copyright duration, and only give copyright if a copyright statement is specifically affixed (e.g., an "opt-in" instead of an "opt-out" system). This will enable new innovations to more easily build on previous work. The specific length should be based on a scientific economic study; see this for one such analysis:

http://www.rufuspollock.org/economics/papers/optimal_copyright.pdf

I provide these comments as a private citizen; I do not represent my employer (or anyone else). But I believe many others share my concerns and would agree with these recommendations.

Thank you for your time.

--- David A. Wheeler