Thank you for your comment, Denyse DuBrucq.

The comment tracking number that has been assigned to your comment is OSTS2012D50302.

Comment Date: May 4, 2012 13:37:19PM
OSTS 2012 Draft PEIS
Comment ID: OSTS2012D50302

First Name: Denyse
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Last Name: DuBrucq
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Zip: 454041136
Country: USA
Privacy Preference: Don't withhold name or address from public record
Attachment: BLM RD&D 1-4-10 Lease application.pdf

Comment Submitted:

Please find our 2009, January 4, application for experimental use of lands in Colorado to extract fuel with our patent technique.

This should be tested to determine whether this is not preferred for its clean, cool method in contrast to current practices of harsh chemical fracking and water displacement to bring fuel to the surface.
AirWars Defense lp

and

CryoRain Inc.

Lease Nomination to the
Bureau of Land Management
Research, Development and Demonstration
(RD&D) of Oil Shale Recovery Technologies
in the State of Colorado

January 4, 2010

Submitted by

Denyse DuBrucq  EdD
Managing General Partner of AirWars Defense lp
and Founder of CryoRain Inc.
and Inventor of the Method Applied
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**Appendix A** - List of AirWars Defense and DuBrucq Patents
**Appendix B** - AirWars Defense lp Capability Statement
Lease nominations must, at a minimum, contain the following information:

(1) Name, address, and telephone number of the applicant, and the name, address, and telephone number of the representative of the applicant who will be responsible for conducting the operational activities.

AirWars Defense lp, partnership with patents applied to this effort assigned to it, and,

CryoRain, Inc. applicants, 100 W. Elm Street, Cedarville OH 45314-8575 937 766-4660 937 766-4760 fax DenyseDBQ@aol.com


Denyse DuBrucq EdD, will be the responsible for conducting operational activities. She is Managing General Partner of AirWars Defense lp. A Colorado registered partnership as of July 26, 2002 with entity number 20021204951 at the Colorado Department of State.

She currently resides at 100 W. Elm Street, Cedarville OH 45314-8575 with phones: 937 766-4660; 937 766-4760 fax and e-mail addresses: DenyseDBQ@aol.com, and AirWarsDefense@aol.com.

(2) Statement of qualifications to hold a mineral lease under the Mineral Leasing Act (MLA). Qualification requirements can be found in 43 CFR subpart 3902 of the final oil shale regulations (see 73 FR 69414).

Denyse Claire DuBrucq is a citizen of the United States, born in Green Bay, Wisconsin, June 1, 1937. She holds 51% of AirWars Defense lp as Managing General Partner and AirWars Defense lp will be the major share holder in CryoRain Inc. Thus compliance with 43 CRF part 3902.10

She is not currently a leaseholder in any US BLM Federal Oil Shale lands. Application for use of the one mile, 640 acre tract determined most appropriate will be made following submission of this proposal January 4, 2010.

AirWars Defense lp, and CryoRain Inc. are new to the BLM RD&D effort and will be applying for the first time for use of these lands. DuBrucq discovered the method starting in 2007 and has enlarged upon it since that time with four patents dependent upon the now issued USP 7,631,506 issued December 15, 2009. She at that time applied her earlier discoveries of the characteristics of liquid and gaseous Nitrogen that have enabled the extraction method used.

(3) Description of the lands, not to exceed 160 acres, in accordance with 43 CFR 3901.10 of the oil shale regulations, together with any rights of way required to support the development of the oil shale R, D, and D lease.

One 160 acre tract in Colorado – Piceance Creek Basin, provides opportunity to extract fuel with extraction zone following shale seam contour in some zones and horizontal patterning in other zones. Colorado – Rio Blanco County Section 1631, square mile #33, is requested reserved for this proposed effort with the 160 acres for the initial work closests to County Road #5 at junction of CR-24. Part is privately held by EnCana Corporation. AirWars-CryoRain will work east of their holdings. If they have selected this block, AirWars-CryoRain will opt for similarly located space in Block #4 in Section 1661. An absolutely square area will
be divided into 36 squares. To get the best survey of the configuration of fuel rich oil shale, the initial nine squares 880 x 880’ will be as here described: along the western side of the square, all six zones, in the next row in, the second and third from the North and in the third row, moving East, the third square.

This is the image of the section with the river and roadway on the western edge of the Block. This will provide easy access and being near the river bed should reduce the overburden in the first set of extraction zones. It also will limit the infrastructure costs of laying extensive roadways to the location.

CryoRain Inc. and AirWars Defense lp, will apply together for one lease. With means to have 36 extraction zones in the territory, we can design some following the shale contour and some using a fixed horizontal design of the zone layers. If there is little difference between the fuel extraction levels between the "horizontal" and the "follow the contour" extraction zone configuration, we will continue with the horizontal because it is easier to gauge. If there is greater output from the contour, we will know that the ventilation flow is better along the planes of the contour and will study this as we plan depths of the initial drillings for the auxiliary holes in comparison with the center shaft. Using DuBrucq’s Boring Green drill designs, US Application 12/292,283 filed Nov. 14, 2008, cores of the extraction zone are recovered with each drilling. Using either the vertical water jet cutter or the dry cryo coring, full core samples are available from the drilling process.
AirWars Defense lp & CryoRain Inc.   . BLM RD&D Lease – Colorado Page   5

Here we are applying for a square mile, 5280’ x 5280’ which is 640 acres, we will alter the size of the extraction zones from the 900’ x 900’ x 15’ measurements to 880 x 880 x 15’ size so we fit exactly 36 nine-zone regions in the tract of land leased. These will be six across, six down, and will go layer by layer such that some sixty extraction zones stack vertically for a 1,000’ deep seam.

(4) Description of any additional lands you request be reserved for a preference right lease, adjacent to your R, D and D lease area and not exceeding 480 acres.

As implied in the response to (3), the full 640 acre section, one square mile, is requested so the adjacent 480 acres includes three additional 160 acre plots including along the south border a 3 x 3 zone square starting the second column from the center south, three squares 880’ x 880’ going down and across; along the West the last two three zone rows with the Eastern row also including the top three zones along that side; and, finally, the remaining zones starting in the second row on the North border four squares, the second row starting the third square and going to the fifth square, and the third row starting with the fourth square and including the fifth square.

(5) A narrative description of the proposed methodology for recovering oil from oil shale, including a description of all equipment and facilities needed to support the proposed technology.

A. Description of the method, stating problems and need

To move the United States toward fuel self-sufficiency, beginning to produce the hundreds of billions of barrels of oil shale is a crucial goal. To do this, the kerogen in oil shale must be cracked and brought to the surface. Current efforts on six RD&D leases on BLM lands in Utah and Colorado and elsewhere have made limited progress toward that end. However, in a pair of patents of Denyse DuBrucq assigned to Air Wars Defense lp, US Applications 11/903,346 and 12/217,915, reviewed by Dr. Jeremy Boak, Director of the Center for Oil Shale Technology and Research at the Colorado School of Mines he finds “no show stopper.”

Here are the unique features of this novel technological approach:

- has a small impact on the landscape.
- has no moving parts in the extraction process.
- uses no water from the environment.
- bathes the entire process in Nitrogen – a fire suppressant.
- has no exhaust except in some configurations, Nitrogen gas.
- leaves the ash in the ground taking only the fuels and water.
- separates the fuel fractions in the extraction process.
- supports a totally thermal driven movement starting at –195°C, hitting midpoint at fuel evaporating maximum temperature, +375°C., and ending at –190°C.

With this exclusive ability to draw fuel from oil shale implemented, the US oil imports diminish. Economically, the $1.00 per gallon price of Liquid Nitrogen delivered in quantity produces 250 gallons of cryogenically cold Nitrogen gas which rapidly freezes and allows fracturing of the rock. Nitrogen gas, a fire suppressant according to NFPA Code 2000, then carries the fuels as they evaporate from the shale in the zone to the surface and through the condensing apparatus. Having this clean, inert gas carry the fuel makes the fractionating process clean and swift without modifying the extractants as they are having no reaction with the carrier.

The surface penetration pattern uses a square 13 x 13 matrix of drillings spaced at 24’ over an 880’ x 880’ square with the center drilling some 18” in diameter and the auxiliary drillings 8” diameter. These just under 19 acre zones have the condensing apparatus fed from the center hole and freezing followed by heating happening at the 168 auxiliary drillings. These patterns are developed starting at the center where the hole is drilled to the initial oil shale level and extending 15’ downward into the shale layer. It is then cryogenically frozen using the patented method from USP 7631,506 of DuBrucq issued December 15, 2009 of raining Liquid Nitrogen
through a sieve of spaced apertures falling by the force of gravity down the vertical drilling to the extraction zone, being the last 15’ of the drilling, flooding it with cryogenically cold Nitrogen gas. Thermal conductivity of the Oil Shale rock is instantaneous in that cooling a corner of an oil shale rock will produce the rock totally coated with hoar frost almost the moment the coldness is applied. This treatment expands water contained in the rock 10% increasing porousness of the rock and brittleness in that pounding with sound can fracture it further. The result of this treatment is the 15’ of the shale layer in 20 some feet radius is both porous and partially shattered making passage of evaporated fuels carried by Nitrogen gas possible. The initial equipment is removed from the central drilling and heating equipment and wind induced sound equipment are covered by insulation surrounding an inverted funnel and pipe to the surface and connecting to the condensation apparatus.

The first square of auxiliary holes are drilled to the shale surface and penetrating 15’. The cooling treatment is applied in each hole extending the freeze zone inward to the extent of freezing from the initial cooling and outward 20 some feet. The center is heated to 375°C to insure the kerogen cracks releasing a range of fuels from natural gases to heating oil weight carbon compounds. This starts a series of expansion of the heat zone likened to a set of mixing bowls starting with the smallest at this stage where the heated zone is the space in the bowl and the freeze zone the bowl component. Once the heat zone reaches the first auxiliary drillings, these drillings are converted to heating and the next ring of holes, now 16 in total, are drilled and the cryogenic cooling done there reaching inward to the bounds of cryogenic cooling and outward 20 some feet. This is repeated as the heat zone expands through the next to the last ring of drillings. With neighboring zones, the outer drillings are alternately heated so as to harvest fuel from the maximum largest space without dropping the protection of the freeze barrier between the zones.

Three stages into the extraction of the seam shows the expanded heat zone developing and augmented with an auxiliary heater and the cold zone sealing the system with ice keeping ground water out of the extraction zone. Here Liquid Nitrogen is fed into the extraction zone from the condenser path and from the second set of auxiliary holes.

The process is illustrated here with the temperatures shown in color according to the code. During the process there is no change in temperature once it is brought to extraction temperature. This means there is little wear and tear on any of the equipment. There may be ground shifts with the cooling and heating that will capture our heaters, thus some will have to be replaced as we extend the extraction to zones below this one in 15’ increments. Efficiency of groups of zones is proven in the cost analysis given on Page 9. This is a Green technology – little disturbance of the land.
Factors going into the design of this thermally driven extraction method include:

- Using Nitrogen gas as the solvent rather than water or CO₂ insures inertness to the volatile fuels and, with its classification as a fire suppressant in NFPA Code 2000, a flash free carriage of the fuels to the surface for thermal differential separation.
- In that Nitrogen is 78% of the air, excluding humidity factors, carriage of smoke and odors in the air from smoke stacks, fire places, and perfume effects, the Nitrogen serves as a carrier of organic materials as particles and evaporants.
- With Liquid Nitrogen’s availability world-wide, we can obtain pure Nitrogen with reasonable ease and at an affordable price considering we use pure Nitrogen gas as the carrier, which at room temperature is 250 times the volume of liquid Nitrogen provided. Contrasting this with water which is a 1:1 input vs. volume when used as the solvent. One truckload provides 250 truckloads of our choice of solvent.

As oil shale seams are known to extend 1,000 to 2,000 feet in depth, the reverse piling of extraction zones allows layering of these zones, harvesting the fuel from one layer at a time. Grouping the 2 acre extraction zones allows full extraction of the 15’ layer moving the freeze zone, see #6 locations below on the right, in and then out from the center of a zone can bring the fuel from the entire area of combined extraction zones. Optimum is to have nine zones in a square with one middle location and eight surrounding it. Outer frozen areas are maintained to prevent ground water contamination from the already extracted zones above that being worked. Here there are five extraction zones grouped. Six zones have been extracted bringing the depth to 90 to 100’ depth and the seventh zone is initiated. Working the small 300’ x 300’ x 15’ zones gives a controllable situation with reasonably rapid thermal changes needed to first rupture the shale layering by freezing to brittle the zone section, then heating the center to 375°C to crack the kerogen at 300°C. and evaporate the hydrocarbon segments through the Carbon chain size of heating oil components. As the active extraction zone expands, initial rings of supplemental holes are drilled and the ring around the heated area frozen to brittle allowing the heated area to expand while maintaining the frozen periphery.

This is repeated for the six rings of extraction. For outer margins between these zones, the outer ring in one can be heated relying on the support of the frozen edge of the other. Then the heated one, when extracted, can be frozen while the frozen edge of the other is heated and extracted. This leaves the full area fully extracted excepting for the outer edge of the 900 x 900’ square if it is exposed and not neighbored by another 900 x 900’ square. Both these extracted sections between the extraction zones and the outer rim maintain the frozen section to repel future ground water invasion. To view patent application 11/903,346 go to www.USPTO.gov and use publication number 20090079255. For drawings, contact DuBrucq at AirWarsDefense@aol.com. She will attach the figures, drawings, in the patent application.

The following illustration from application 12/217,915 shows a stack of six zones for five extraction zones and the beginning activity for the seventh layer deep. With the completion of the extraction on any zone layer, the thermal input is stopped allowing the ground in the zone to return to ambient temperature. When the ground warping because of the heat has recovered, the heaters will be drawn up to the surface to be checked out and reused in the next layer down or in other fields. The freeze zones, however, are maintained for the duration of fuel extraction for that area of fuel extraction. In other words, it continues until the bottom of the shale seam is empty of its Kerogen exhausting the fuel contained in that surface area of the seam.

The blue area shows the surface. The elevated shows the depth. The tubes represent the centers of the extraction zones where the “0” is indicated in the number array in the blue area. Surrounding the “0” main shaft are six squares which will be drilled in sequence to first, expand the freeze zone, and, second, once the freeze zone is extended to heat that location to expand the extraction zone that is heated to 375°C. The pattern of drillings are in the square of sequential odd numbers, 3², 5², 7², 9² 11² and 13² adding eight new drillings per expansion, as given in the squares, 9, 25, 49, 81, 121 and 169.
In practice, each square expansion may be started with the drillings in the center of the sides and then proceed to the corner locations since the spacing is greater from the main shaft to the corners. Main shaft to the first square center is 24' and to first square corners is 33.882'. The second square centers are 48' from the main shaft and the corners 67.764'. This detailed expansion keeps the freeze zone rounded and progresses as the heated zone expands. On the right is the pattern of the drillings showing the main shaft as “0” and the auxiliary squares numbered from “1” near the center to “6” at the external location. Without a mating extraction zone, square “6” treatment stops at freezing. With a mating extraction zone, square six sides mating are alternately frozen, then heated to extract fuel, and again frozen to keep water out.

Full field exploitation for shale has simultaneous, multi-zone extraction.

Drilling using the standard hammer drills brings heavy machinery into the site. DuBrucq, the inventor of the AirWars’ Liquid Nitrogen and other patents, has designed a vertical water jet cutter means of creating the needed holes as well as a cryo, dry coring process. These systems of drilling can be handled by the site crew making more to do in each shift. It has the surface appearance of ice fishing with a hole, ever deepening, bored into the ground without disturbing surface growth except to place the small hut over the hole location. Sections of rock, cut cylindrically, are raised from the hole as it is extended. This allows a complete picture of the boring piece by piece. These can be assayed for mineral content giving depth of these materials. The water jet cutter can recycle sixteen barrels of water, sourced after the first filling, if needed, from the water drawn in the extraction process, thus, except for the initial drawing of the water, no further need for water is realized. And, if the cryo coring works, it uses no water.
The preferred means of selling the extracted fuels and other gases is to have buyers provide vessels for collecting the fuel at the site. These will then be filled and sealed and the buyer can arrange transport. This way there is no need for fuel transfer above ground at the site.

With the range of fuels, it is anticipated that several buyers could be purchasing their preferred fractions of the emerging fuels. If we have delivery of the Liquid Nitrogen by Huey Helicopters, the copters can carry some of the rarer fuels to the air gas firms from which they came. We may choose to lease an on-site Liquid Nitrogen plant producing some 2200 gallons/day which should suffice the needs for the square mile of extraction zones. With shale this is practical because the seams are possibly 1000 feet deep or more so operations can go some five years on those sites to complete the extraction process exhausting all the oil shale. These are available from Cosmodyne and we have negotiated a price for the Saudi remediation work.

B. Overview of Proposed Project

The thermally driven method will separate the fuel fractions in the process of extraction. The equipment needed for the cooling units, the heaters and the vertical water jet cutter drill will be constructed. We are applying for one location of BLM RD&D lands to have 640 acres, one Square Mile, for Proof of Concept and some commercialization in the Picean area of Colorado. To test advantage of having the extraction zone fit the contour of the rock formation of the oil shale compared with horizontal extraction zones rather than following the rock seam contour, we will in the first area test both methods and compare output. We are funding to the first third of the Proof of Concept in the field and plan to use revenues from fuel sales to cover the remaining extraction costs:

<table>
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<tr>
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<th>1 – on 2 acres</th>
<th>9 – on 20 acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extraction Zone 300 x 300 x 15' Volume</td>
<td>1,350,000 Cu. Ft.</td>
<td>1,350,000 Cu. Ft.</td>
</tr>
<tr>
<td>Fuel to Shale ratio</td>
<td>22%</td>
<td>22%</td>
</tr>
<tr>
<td>Fuel in gallons</td>
<td>2,221,560 Gallons</td>
<td>2,221,560 Gallons</td>
</tr>
<tr>
<td>Extraction Portion</td>
<td>69%</td>
<td>78%</td>
</tr>
<tr>
<td>Extractable Fuel Barrels</td>
<td>30,835 Barrels</td>
<td>34,523 Barrels</td>
</tr>
<tr>
<td>Revenue at $50/barrel</td>
<td>$2,158,450</td>
<td>$2,416,610</td>
</tr>
<tr>
<td>Cost</td>
<td>$1,365,571</td>
<td>$787,750</td>
</tr>
<tr>
<td>Gross Profit per Zone</td>
<td>$792,879</td>
<td>$1,628,860</td>
</tr>
<tr>
<td>ROI (6 months)</td>
<td>158%</td>
<td>307%</td>
</tr>
<tr>
<td>Cost per Barrel extracted</td>
<td>$44.29</td>
<td>$22.82</td>
</tr>
</tbody>
</table>

The differences here are accounted for in the number of personnel devoted to each zone and the sharing of drill costs. These figures are assuming the shale quality of Colorado basins and sale price average of $70/barrel for water-free separated fuel fraction sales. It is included, not to brag of possible cost per barrel of fuel, but to show the efficiency of colonies of extraction zones in a single operation.

Jobs created are currently a talking point. Since the temperature is always up and the fuel doesn’t stop flowing, we staff on a 24/7 basis. For safety, a minimum of three people must be on site at all times. One to find a problem, one to come to the rescue and one to call for help. With added extraction zones, we must have one person responsible for each zone, thus with nine zone squares, we employ 12 person teams, which is a major factor in money savings. Twelve person teams 24/7 means there are 48 people working 42 hour weeks. Allowing for personal and sick days, staffing is at 52 people per 18 acre tract. For a single extraction zone, 13 employees are required as crew members. One gets nine times the extraction for four times the number of employees. Shifts can be bunched so workers stay in the field four days working three ten hour days and one twelve hour day and then come home for three days.

One major cost is drilling. Each extraction zone requires one major shaft to be drilled with an 18" diameter and 168 auxiliary holes of 6" diameter. Conventional oil field drilling can be done, or, with success in development, a new vertical water jet cutter design of Denyse DuBrucq.
may be used. This method takes one gallon a minute for the cutter and requires removal of
the water, drill grit and rock dust keeping pace. The water can be recycled such that 16
barrels of water will provide water for eight hours of drilling. This new drilling technology has a
low footprint on the ground and resembles ice fishing in that it can be done without removing
the major plant life in the area. The by-products of this drilling method are saleable rock dust
and cylinders of rock 6” to 10” high which can serve as walkways and the like. As the drilling
gets into the oil shale range, these cylinders turned into a pathway could “blaze a trail” literally,
or we could extract the fuel from these before sale bringing a safer situation both for transport,
storage in the marketing process and in use by the consumer.

The overall site of fuel extraction will have equipment installed for every two acres extracted.
And as the zones require vertical expansion, the placement will be the same. Once the
extraction process is finished, the land will have most of the growth it had from the start and
the equipment will be cleared out to be used, after maintenance, in another location.

The grouped extraction zones can be worked sequentially, in groups or all at once. Following
is the step by step process for one extraction zone measuring 293 x 293 x 15’, and the
extraction group 880 x 880 x 15’ allowing 36 groups in the one mile square – 640 acres.

Once we get a layout the plot of land available, we determine the best placement for the
groups of extraction zones. We then plot the main shaft locations for the nine component
sections using GPS locator equipment. As these zones are implemented GPS locates
auxiliary hole positions as well. At the site, layout the main shaft locations for the initial group.
For the Horizontal zones, main shafts will be in the center of the 293 x 293 x15’ areas. For
contour zones, it could be the highest point in that area. Main shafts are drilled first.

Gather the drill, the freezing equipment, the main shaft heaters and three auxiliary heater
units. Freeze the main shaft rock by bathing the shaft in just evaporated Liquid Nitrogen –
cryogenically cold -190°C gas, flooding it with a new batch every hour or so. It will take 160
pints or 20 gallons of Liquid Nitrogen to flood the 15’ x 62.8 sq.in. main shaft. To test the cold
transfer to 25’, the four closest locations of auxiliary holes can be drilled and the temperature
of the extraction layer rock measured. As its temperature gets in cryogenic range, the
flooding of the main shaft with Liquid Nitrogen can stop. The shaft should be covered to retain
the Nitrogen atmosphere.

We then lower the acoustics to sound pound the rock. James Saenger, pipe organ designer
and builder and carillon player for the National Cathedral and other Washington DC landmarks,
will tune dissonant apparatus to have maximum affect to shatter the cryogenically cold rock.

To transition between the cryogenic cold of the shaft and placing the motor oil filled heaters, or
alternative with a heater and extruded aluminum radiator, the shaft region must be heated by
inserting the Nitrogen gas transfer system. The only change in the system is the mounting of
three auxiliary heaters at the top of the vertical piping insulating it such that the heat
generated is concentrated on the two feeder lines for Nitrogen and the wide extraction tube so
as to raise the temperature of the Nitrogen expelled at the base of the main shaft to as close
to 375°C as practical. This will hasten any natural gas components along the condensation
apparatus and will heat the rock at the base of the main shaft sufficiently to not freeze solid
the main shaft heaters when they are installed. Heating Nitrogen gas until the near main shaft
vicinity temperature is about 20°C, the main shaft heaters will not be hampered by solidifying
of the contained motor oil. Upon installation these heaters are heated to temperature and
checked for proper function, leakages, and any weaknesses at the elevated temperature. The
Nitrogen piping is raised from the shaft and the heaters, still at 375°C are lowered, one by one,
into place at the base of the main shaft. Then the acoustical equipment and the Nitrogen gas
transfer system are lowered into place. No further adjustment or movement of this equipment
is made until all the fuel is extracted from the zone extraction zone – expected to be
completed in several months.
To complete the cycle for the main shaft, when the fuel is completely extracted from that zone, the heaters are turned off allowing the zone region to cool to normal temperature. Nitrogen gas transfer system and the acoustic equipment are removed, and when any thermal ground sift is corrected in the cooling process, the main heaters are drawn to the surface. Then the main shaft is drilled deeper by 15 to 20' to start the next extraction zone in the pile. “Gather”

Having the thermal gradient from Liquid Nitrogen temperature of -195.8°C. to the evaporation temperature of heating oil, +275°C to +375°C, we have a passive separator for the fuel fractions. The following picture with the labeled fractions collectible is drawn to fit the patent requirements for drawings on a single page. The pipes could stretch along a straight path in practice. As we pass gasoline fractions getting rid of the water extracted, the Natural Gas components separate easily because the ‘anes’ separate out at widely differing temperatures.
To carry it to the extreme, we can isolate the Oxygen/Argon component together and then bleed off the light weights, Hydrogen, Helium and Neon into mylar balloons. The Nitrogen then passes on and could be reliquified since it is pure and cold – in the range of -190°C.

Stating again, buyers for these fuels should provide their own containers so there is no on-site transfer of fuels. Because we do capture the Natural Gases we get extra income beyond those who collect the liquids only. And separated fuels may draw a better price than that quoted for crude by the barrel. This method will get a reasonable income with fuel prices at or over $50/barrel. All projects are using that price.

Following is the illustration of the condensation section of the cryogenic fuel extraction system with the labels indicating the sourced Liquid Nitrogen and the output fuels and substances. The N₂ gas could be reliquified since it will be at about -190°C and adjacent to the LN tank.

Phil Nash will be working on the IT thermal controls keeping the designated weights of output stable. The thermal status for catching heating oil is between +375°C and +275°C.; for the kerosenes, Diesel fuel and Jet fuel, compartmented or not, between +275°C and +175°C.; and gasoline, heavy and light, between +175°C and +60°C..Containers here are standard drums illustrated foreshortened for space considerations. Light ethers come off between +60°C and +30°C and the hydrocarbons are captured over their boiling points of Butane at minus 0.5°C.; Propane at -42°C.; Ethane at -89°C.; and Methane at -164°C. The Oxygen/Argon segment is captured at –182 to -186°C. and the light gases separate from the heavy Nitrogen molecular gas by gravitation, leaving Nitrogen gas at about -190°C pure and available for compression or liquefaction to be used in drilling and/or reused in the extraction process (see DuBrucq patent application 12/383,586. upon request at AirWarsDefense@aol.com.)

Cross sections of the condensing pipe are as shown here with extent of insulation defined.::
The condenser system shown here has across the top a side view and lower a cross section. The whole system is insulated with two Nitrogen pipes and a larger pipe carrying the Nitrogen and fuel to be condensed. Heat transfer is affected by metal spacers thermally connecting pipes. Drains are shown. Heated traps assure single fuel types.

In the lower right hand corner of the above drawing is the Light Gasoline and Water tank where the heat difference in condensing is between +130°C and +70°C. This will condense two segments of liquids, the organics and the water and water affinity organics as alcohols. The drawing on the next page shows this vessel with a long tall sieve unit that has a mass lighter than water and heavier than the associated thermal condensing organics. It flows above the water and below the light gasoline organics with long tubular holes that allow the meniscus between the liquid groups to take place in the tubules keeping the disruptions from disturbing the separation process. We may have to use two containers to collect this fraction so one can be receiving the current condensed material and the other sitting quietly allowing the separation to be taking place without infusion of new material. In separating the organic portion from the water and water soluble compounds, once equilibrium is reached, the organics are drained off with a siphon or faucet set at the level above the sieve divider to bleed off the organics. Second, the bottom draining faucet is opened to drain the water segment to the point where the sieve unit nearly reaches the top of the exit tube. Once this is done, the emptied canister with the sieve still in place is placed to catch the condensation.

Left is the Light Gasoline condensation apparatus. To the left is the operational drawing on the condensation system. Center shows the details of the condensation tank with the sieve and the means to empty first the organic portion and then the water portion. In the upper right is the drawing of the long, tall sieve unit with a mass less the water density and greater than the organics’ densities condensing in the +110°C - +90°C range condensing unit. Fuels are mixed after the water is out of the center drain in the section.
Because the water segment can be bled off and released in the environment or be used in the water jet cutter used for ecologically friendly drilling, we need to know what can be water soluble and included in this segment. Reviewing boiling points of common chemicals, those in the condensing range include:

<table>
<thead>
<tr>
<th>Substance</th>
<th>at temperature in °C</th>
<th>reaction with water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Allyl Alcohol</td>
<td>97</td>
<td>soluble</td>
</tr>
<tr>
<td>(vinyl carbonol or 2propen1ol)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toluene</td>
<td>110</td>
<td>insoluble</td>
</tr>
<tr>
<td>Petrol</td>
<td>95</td>
<td>undefined chemically, soluble</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fuel expanded with water</td>
</tr>
<tr>
<td>Propyl alcohol</td>
<td>97.5</td>
<td>Soluble</td>
</tr>
<tr>
<td>Heptane – n</td>
<td>98.4</td>
<td>insoluble</td>
</tr>
<tr>
<td>Butyl-n alcohol</td>
<td>117</td>
<td>soluble</td>
</tr>
<tr>
<td>Ethylene Bromide</td>
<td>131.7</td>
<td>slightly soluble in water,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>soluble in organics</td>
</tr>
<tr>
<td>Too high a temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon tetrachloride</td>
<td>76.7</td>
<td>low solubility in water,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>soluble in organics</td>
</tr>
<tr>
<td>Below the thermal limits</td>
<td></td>
<td>Solubility in Water: .06%</td>
</tr>
<tr>
<td>Benzene</td>
<td>80.4</td>
<td>More soluble in organics</td>
</tr>
<tr>
<td>Methanol</td>
<td>64.7</td>
<td>Not condensing in this range.</td>
</tr>
</tbody>
</table>

Contaminants like Mercury, Arsenic, and Phosphates are not evaporated in the extraction process, thus are not in the water as it condenses. However, if the water is so pure that it picks up the salts in the ground components, and if these materials are there, if the water is not “presalted” before release, there could be leaching of the surface materials. $H_2S$

Perhaps the best way of handling the water situation is to see what we do get in the water segment of this light gasoline/water segment and treat it as directed by EPA or other authorities before release or reuse of the water segment. Or, I suppose, we could bottle it for use with steam irons, but that market is pretty dry at this day and age.

And, finally, the technology of the field expansion of the extraction zone with use of auxiliary holes. The extraction zone measuring here 293 x 293 x 15’ is an encapsulated space underground in the oil shale which either will be horizontal, the same base height above sea level throughout the space, or contour, following the rock undulation and angles over the geographical area making a larger area with variance of sea level measurements throughout. The advantage of the horizontal placement is that the Nitrogen flow can be somewhat predicted, but the penetration rates as it crosses striations in the rock texture and composition may vary. The contour advantage is that there is consistency in the penetration of Nitrogen through the striations of the rock, but the height of the extraction zone varies such that it would be advantageous to have the highest point that for the main shaft, with the auxiliary drillings below so as the Nitrogen heats, it can rise and flow through the striation it is in to the main shaft.

C. Specifics
To help, the whole area is thermal controlled as the active extraction expands to the full extraction zone area. We will use the horizontal pattern in this discussion because, at present, I am not sure what the contour zone should be, and since the variance is near infinite, these zone patterns may never be the same, one with another, except in the vertical pile for that whole extraction zone going in the zone area from the top of the shale seam to the bottom.
This is the pattern of drillings in the first three expansions of fuel extraction. The first is the main shaft, center, second is the first square of holes, and third is the second square of holes. As was carefully described, the initiation of the main shaft, as the center is first frozen cryogenically with Liquid Nitrogen, and then the center is warmed and finally brought to temperature, 375°C, which first cracks the Kerogen, the huge organic molecule in oil shale into shorter carbon compounds and then evaporates those carbon compounds which are included in heating oil and lower temperature fuels – kerosene, gasoline, natural gas. The Nitrogen from the cooling process heated carries the organics to the main shaft and up the extraction tube into the condensation system.

To protect the heated zone from external ground water, the outer freeze zone is expanded by cooling the extraction zone at the first square of auxiliary drillings. This allows expansion of the heated zone to go to the point of the double circle drawn surrounding the main shaft. Now the Nitrogen used in cooling will come from both that fed into the main shaft and that provided through the eight drillings where it is used to freeze the outer rim of the current extraction zone. As the heated zone expands approaching first the four closest drillings to the main shaft, the second square of holes are drilled nearest to them and the cooling units are inserted expanding the cooling zone and, in the first square drillings the cooling unit is replaced by the auxiliary heaters. Below, left, are the cooling units, filling with Liquid Nitrogen and dumping it.
This starts the expansion of the extraction zone to the second ring of drillings, center holes first, then extreme corners, on to include the full six square pattern. The outer square, the sixth, when the extraction zone is isolated, stays frozen. When it is in a pattern of extraction zones, the sixth square can be heated and fuel extracted having the neighboring zone’s sixth square frozen. Then that zone’s sixth row is heated and the original zone’s sixth row frozen getting all the fuel from all but the outer segments of the sixth rows. Refer here to the third page of this fourth section (4) to see the six square patterns on a plane and the stacked zones as they are developed.

D. Project Activities and Timeline
The initial proof of concept includes building equipment, and starting the extraction process on RD&D lands of BLM which will take a total of seven months to get revenues taking us beyond the need for further support funds. With applications for the leased lands due January 4, 2009, we have the opportunity to begin extraction in five months, sometime in June, 2010 and have the system in full operation to allow operating over the winter with sufficient warming houses placed to protect the crew as they operate the full system. Insulation of the collecting units for the fuels will be in place as will be the roads and passage ways to the extraction zones. Also, by the first snowfall, the eight encircling extraction zones should be in process so that through the coldest time of the year, everything should be continuing to function.

E. Outcomes
The fuel flow will begin a period of profitability which will fund rapid expansion of use of AirWars' method both on BLM lands starting with the initial extraction zone’s second ring of drillings. With the plan to lease three RD&D lands and in their initial zone work, we will determine the importance of working the contour of the shale seam vs. horizontal zones, and we will be able to evaluate the importance of this method for less rich oil shale

As the heater units in the main shaft have been in operation for several days, the four auxiliary holes should be equipped with freeze units, and the corner four holes in the first ring should be drilled and they too be fitted with the freeze units and Liquid Nitrogen applied every two hours in the four liters it takes to fill the LD-4 dewars.

Then the heaters, shown above, can be lowered, hot to 375°C., into the four closest holes to the main shaft, and then the corners.
extraction activities. Of the best between the contour and horizontal extraction, we will use
the best unless the difference in cost and bother of designing to a convoluting contour is too
much effort compared to the savings it would bring. Also, if the method proves profitable,
the less rich shale lands will be exploited along with the prime lands. The broadest success
here will allow our services in extracting the fuels from the more recently discovered share
areas in Montana, North Dakota and in Canada, Saskatchewan, and throughout the world
allowing our export of equipment and training. The goal of weaning the USA from imported
oil can be met with success of this technique.

F. Evaluation

The best gauge of success is extracting sufficient fuel to support the expansion of use of
the technology. Questions of the containment of the heat applied in the zone to be
extracted, the success of keeping out ground water with the frozen boundaries, and the
capability to stack the zones successfully to extract the full 1,000 to 2,000 foot depth shale
deposits must be proven. The question of prominence is “Does the CryoRain – AirWars’
method meet the projected fuel harvest at the going price of oil fractions to profitably
operate fuel extraction from oil shale?” If so, it’s go.

(6) A narrative description of the results of laboratory and/or field tests of the proposed
technology.

Without having access to oil shale lands to this point, the AirWars Hydrocarbon Harvest
technologies have not been field tested. However, there are some proofs that were gathered
when experiencing the oil shale that are relevant to predicting the success of the technology.

First, the Hydrocarbon Harvesting from Coal, Shale, Peat and Landfill seams, US Application
11/903,346 and international application PTC US2008/010744 filed September 21, 2007 and
September 15, 2008 respectively, requires that thermal transmission, both hot and cold, is
necessary. Taking a hand sized chunk of oil shale provided by Jerry Boak of the Colorado
School of Mines, placing a small edge in Liquid Nitrogen caused the whole block immediately
to host hoar frost over the entire surface, top, sides and bottom indicating quick thermal
transmission. This should allow the freezing of the shale formation some 25 and 34 feet from
the main shaft and from the auxiliary shafts as the extraction zone is expanded. This certainly
is not an insulating material. Thermal conduction is extremely high.

Second, in what was a mortar appearing shale section, when the shale was cryogenically cold,
striation patterns like in the other piece which had character, rows of striated shale layers
appeared. When it warmed to room temperature, the pattern was again not recognizable.
This would indicate that there is some spacing adjustments when the contained water freezes.
Water, liquid, conforms to the neighboring solids. When frozen, it too has shape, and is the
only liquid that expands rather than contracts in volume when it freezes.

We can assume that the volume of ice when freezing, which doesn’t happen beyond the
permafrost in winter, will raise the layers of shale where water has found refuge. It can
explain the patterns when frozen on the otherwise bland exposed side of the oil shale. Nine
percent expansion isn’t much, but it might be enough to flip the shale layers open so, when
the kerogen is pyrolized and expands 40%, the fuel hydrocarbons will find an escape from the
body of the shale (source Jerry Boak, Director COSTAR, Colorado School of Mines). The
openings of the layers is assumed to filter through it the Nitrogen generated in the freeze
zones which will carry, like smoke, the hydrocarbons to the main shaft extraction tube and
proceed upward for condensing separation.
What is the exact change in volume of the water when it freezes as ice?

<table>
<thead>
<tr>
<th>Comparison of:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Liquid water</strong></td>
<td><strong>Ice</strong></td>
</tr>
<tr>
<td>Mass = 100 g</td>
<td>Mass = 100 g</td>
</tr>
<tr>
<td>Volume = 100 mL</td>
<td>Volume = ? mL</td>
</tr>
<tr>
<td>Density = 1.0 g/mL</td>
<td>Density = 0.92 g/mL</td>
</tr>
</tbody>
</table>

**Example:** Calculate the volume in a 100 g ice cube with a density of 0.92 g per mL.

**Solution:** The density translated as a conversion factor is:

\[
0.92 \text{ g} = 1 \text{ mL} \quad \text{“per” is equivalent to an equal sign.}
\]

\[
100 \text{ g} \times \frac{1.0 \text{ mL}}{0.92 \text{ g}} = 108.7 \text{ mL}
\]

The increase in volume of ice is about 9%. This increase causes enough force to break most rigid containers. This is the same force, repeated on a daily basis, that creates “pot holes” in the roads in the winter time. Ref.: [http://www.elmhurst.edu/~chm/vchembook/122Adensityice.html](http://www.elmhurst.edu/~chm/vchembook/122Adensityice.html)

Third, cracking the shale with a rather pointed hammer gave components with concentrated dark surfaces in more than half the pieces indicating dark interfaces with possible concentrated kerogen deposits permeate the oil shale. This can provide the “rivers” of gas passage with the lighter rock space feeding the absorbed Nitrogen and expanded, pyrolyzed organics to these easy passage rivers and out of the shale structure.

Fourth, heating a concentration of small chips with mostly dark outer surfaces in a frying pan using matches as kindling caused the chips to yield a dark substance, as if the kerogen melted and then solidified on the pan bottom as it cooled. These burning matches did not ignite the rock at wood burning temperatures. A butane lighter is said to ignite oil shale to burn openly.

These small experiments are those relevant to this new technology. This is akin to medical testing where a minute drop of blood tested can give needed results, not the ground chunk as a finger or toe. It is felt that bench testing an array of chunks of shale is irrelevant since in the ground, the shale is, for the most part, solid in seams with only cracks occurring over time in earth movements. Further, to see from whence the fuels come, microscopic analysis of the shale rock was used. And checking back after fuel extraction, the evidence was clear since the black balls, beebee appearing, were no longer in the rock.

Fifth, because we are depending on changes in the microstructure of the oil shale to allow Nitrogen passage and to release the pyrolyzed hydrocarbons in reduced length carbon chains, viewing the material under the microscope helps define the structure.
Low resolution view of the edge of the grey strip crossing the dark area of the outside of the oil shale. On the margin of the dark part, amassed kerogen beads fill the surface.

Below is the 10X greater resolution of the grey region. See the kerogen beads throughout the surface area.
These shale samples appear to be fused sand grains with Kerogen beaded throughout the rock and in veins where the broken edges are darkened by concentrated veins of kerogen covering large areas. It is projected that there will be some separation of these sand grain aggregates when frozen. This may loosen the fused sand grain groups so when the shale is heated through 300°C, the pyrolyzing temperature, the 40% expansion will lift the lid on these fractured parts and let out the fuels created as the Kerogen disintegrates into lower carbon compounds. The heat level of 375°C is planned for the extraction process which starts when the space is heated and continues until the extraction zone is completely heated to the outer circles. Where two zones share a side, these are alternatedly heated and recooled so as to have the frozen barrier, but to clear the fuel from the shared sides to get 100% of the extraction zone group emptied.

Low resolution view of the inner parts of the oil shale with beads of Kerogen dispersed within.

Below is the 10X greater resolution of the inner parts of the shale. See the kerogen beads dispersed. The focused image appears only where the rock surface is the same distance from the lens.
Sixth, we anticipate a very small, short sheeted process demonstration with a small piece of shale heated to above pyrolyzing with a shield over it and above the shield, a Liquid Nitrogen cooled getter (-195.8°C) where evaporated fuel and water will collect on the outer wall of the test tube. See the sketch of the lab equipment. We hope to present the results in video.

![Test Equipment for Oil Shale](image)

Problem: I don’t know if the rocks were frozen in shipment. That would make both samples having weak shale bonds and both exude fuel at the same rate. Either way, it will show the condensation of fuel when rock is heated over 375°C.

We worked to get as close to the proposed equipment as possible ending up with the Bunsen burner under the flask with a single oil shale chip in place. Rather than the test tube getter and all that Nitrogen which put out the Bunsen burner several times from the ice bucket with a plastic bottle and stopper with tubing going from the rubber stopper in the Ehrlenmeyer flask. We put a quart of Liquid Nitrogen in the ice bucket. Once it cooled down the inner lining, it stopped putting out the flame on the burner and held its volume.

The first test with the 250ml. Ehrlenmeyer flask was a shale chip that was not frozen with Liquid Nitrogen. and, second, we dropped the second sample in Liquid Nitrogen before processing it.

The flask was flooded with Nitrogen by pouring a little LN in it and letting it evaporate. Then heating started, left. Center, initial material evacuates, then more dense material evaporated.
This sequence is done on the chip that was frozen with Liquid Nitrogen before heating. As the process continued the cooler sides of the flask became clouded with heavier carbon chain fuels until all but the bottom became quite opaque, center. And the tube from the stopper to the plastic bottle in the bath of Liquid Nitrogen (LN) served as a getter collecting the Natural Gas components here showing a reddish streak – the product of the frozen shale chip. The first chip, not cryogenically frozen, produced a yellowish coating on the bottom of the plastic bottle which smelled like rotten eggs – sulfur as Hydrogen sulfide. The smell of the second, pre-frozen chip, was more like burning cloth. We couldn’t tell how much Natural Gas was collected since it does not have an odor. What one smells with Natural Gas release in the home is the added odor factor to make one alert that there is unburned Natural Gas in the environment. We found that a tiny amount of shale here made one very big mess. Much of that was fuel. Predicted to be a 40% expansion of organics caused by pyrolysis, breaking of carbon chain of Kerogen as temperature passes 300°C.

Seventh, before and after weight of the shale in this process will allow our knowing the total extracted material, the fuel and the water component. Taking the mass of the empty Petri dish, then the dish with the collected fuel and water, and then the dish with the remaining water, if any hasn’t evaporated with the burning after burning off the fuel will give some information on the richness of the oil shale. This step was omitted. The size of the chip in each case seemed smaller, though the coloration may have “reduced” the image more than the dimensional change. The light coloration where the dark seams were missing darkened with heating like toast.

Eighth, we can melt the fuel from the getter once the Liquid Nitrogen is evaporated, collecting it in a Petri dish and burning it, timing the burn, and noting the amount of water emerging in the process. Due to equipment sizes and configuration during the heating, we did get light fuel accumulation and pollution accumulation from the heating in the getter unit, the plastic bottle with the stopper feeding the excess gases from the flask into the Liquid Nitrogen cooled bottle.

Ninth, the shale with the fuel and water extracted, viewed under the microscope, will let us know the quality of the extracted shale, whether any of what we imagine to be Kerogen beads are left, and some idea of the porousness of the extracted samples.
The rock throughout the outer surface was toasted dark. Here you cannot see any of the kerogen balls. And at high resolution, still none evident.
Did the Kerogen balls remain in the center of the rock?

Post heating – Nitrogen sample – inside material low resolution
 None found here, and at 10X that resolution?

Post Heat Nitrogen rock  10X, none here either.
Tenth, we can seal the bottom of the rock to a test tube of Liquid Nitrogen which would force Nitrogen gas through the rock. If the tube is not forced from the mounting because of gas pressure build up, we can hold a burning item above the rock and if the fire goes out, we know that a Nitrogen cloud is emerging by passing the Nitrogen through the rock. This proves gas transfer in the extracted areas of the oil shale seam. If we repeat this tipping the rock so the striated formation passes the Nitrogen gas, we can find if there would be a top-bottom passage rate different from that along the striations.

This effort was not done since the heating experiments showed evacuation of the fuels from the rock and the micrographs show the elimination of the Kerogen from the center of the rock as well as the outer surfaces and the quantity of fuel effusing from the rock was in such abundance that the whole chip of rock must have been emptied of the fuel content in the short term heating.

This is the first experience of the inventor of this technology with oil shale.

Robert Chasnov will speak with Eric Johnson the Lab Tech for Cedarville University for our doing the remaining lab work with his witness on Monday, February 25, 2009.

(7) A schedule of operations for the life of the project and proposed plan for processing, marketing, and delivering the shale oil to the market.

Assuming the response to the proposed nominated lands for Proof of Concept are announced by April, 2010, the initial site will have fuel extraction operations starting in June 2010 with revenue flow anticipated by Sept. 1, 2010. With success expansion of the site to 9 extraction zones will begin at that time allowing the eight new zones to be established by snowfall and to continue.

Timeline for events include: 2010

<table>
<thead>
<tr>
<th>Month</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug.</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLM RD&amp;D Lease</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Building Hardware</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Travel, survey site</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Developing Drill</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sourcing Liq. N₂</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marketing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Here the equipment will be designed to install in sections so the equipment can be installed appropriate to the site configurations and in the sequence needed. Fuel harvesting operations begin in April with fuel marketing happening as it emerges from the process. Once sufficient fuel extracted justifies continuing, added equipment is made to complete nine extraction zones in 18 acres of the 640 acre RD&D tract. This size tract will host 36 18-acre extraction zones and as many layers downward as possible depending on the depth of the seam/15'.

(continued on next page)
(8) A map of existing land use authorizations on the nominated acreage.

Referring to the aerial photograph of the one square mile (640 Acres) of Block 1631, #33 Geological Survey Map sourced from MapQuest.com, we find it is located in the Piceance Basin, With the Resource quality in millions of barrels per acre at 2.5. It is accessed on County Rte #5 at junction of CR 24 passing the west side of the square mile and there is view of a road crossing the mid section e-w. Rte #5 leads to State Rte 64 passing west from Meeker, Colorado. The BLM Land map indicates that BLM controls that land, keyed by the golden color. The website showing the location is: http://www.yellowpages.com/map/?from=Branding_cntn_map_us+map&gclid=CP32gZxjg58CFQk75Qod-3f7dQ

“Progress on Reassessing Oil Shale of the Green River Formation at the U.S. Geological Survey” by Ronald Johnson, Tracey Mercier, John Dyni, Michael Brownfield, Michael Pantea, and Jessie Self, shows this square mile is in the Thickness Zone R^ - Rich oil shale zone near test drilling CO215 where 230 – 253 foot depths of seam were measured. The INTV of Mahogany Ledge base to top of R5 is 251-325 feet. Cubic meters of overburden is around 25. And it is color coded purple indicating 26-30 gallons/ton fuel output estimated.
Here is the Colorado Tract Map for oil showing Block 33 in Section 1631. EnCana Corporation owns the river bed of the section, so for the full square mile, may I suggest an equal section of Block 34 be added to give AirWars – CryoRain a full square mile. Since they may qualify for BLM RD&D leases, if they have chosen Block #33, AirWars – CryoRain will opt for Block #4 in Section 1661, just south of the originally requested Block with edging into Block 3 to compensate for lands held by EnCana Corporation.

(9) Estimated shale oil and/or oil shale resources within the nominated acreage boundary.

At 25 – 29 gallons of fuel per ton of oil shale. Continuing the Johnson slides, "And it is color coded purple indicating 26-30 gallons/ton fuel output estimated."

(10) The method of shale oil storage and the method of spent oil shale disposal.

Because AirWars' technology is an in situ process and only the fuels and light gases emerge from the shale seam, there is only shale fuel storage in thermally condensing segments including: 275-375°C – heating oil; 175-275°C – Kerosene with jet fuel and diesel; 130-175°C – heavy gasoline; 70-130°C – light gasoline and water; 0-70°C – petroleum ethers; and then condensed cryogenically, butane, propane, ethane, methane, Oxygen/Argon, and lifted off by lightness, Hydrogen, Helium and Neon. As stated earlier, we anticipate the buyers to supply vessels for the fuels they are purchasing so empties can arrive and filled vessels be taken from the site on a weekly basis, all at once. The heating oil through gasoline will be handled in metal fuel barrels, ethers and lighter in pressurized tanks or Liquid Nitrogen cooled containers. Helium, Hydrogen, and Neon mix can be hauled away in mylar balloons.
(11) A description of any interim environmental mitigation and reclamation.
At each site, we anticipate roads into the extraction zone to each main shaft area for delivery of Liquid Nitrogen and carriage of the fuel containing vessels and delivery of empties. In forested areas, clearance for the commercial drill equipment or the able use of the Water jet cutter drill and cryo core drill described in DuBrucq’s filing 12/292,283 filed Nov. 14, 2008. This may require a small building as used in ice fishing to protect crew members working the drill. This new drill is anticipated to yield cylinders of rock as it digs the 18” main shafts and the 8” diameter auxiliary holes. Pulling from these drillings the rock dust and cylinders can be sold for yard pathways and patios. Grit and water will be recycled. Electricity available on the site or generated power is required and we anticipate burning the collected Methane gas for this and catching the CO₂ in a sunlighted greenhouse situation during the day and an artificially lit greenhouse environment at night. This allows harvesting salads for lunches.

(12) The method of final reclamation and abandonment and associated projected costs of final reclamation.
The working of the square mile location will support 36 18-acre extraction zone groups. It is expected that the initial layer of these zones can be extracted within the first six months and that sequential vertical zones below the original will be extracted in sequence as rapidly as possible. If the oil shale seam is very deep, like 1,000 to 2,000’ in depth, work at these locations may take as much as five years to complete extraction. Since there is only the 18” and 8” drillings disturbing the landscape, and the shale structure is more porous, but dimensionally stable, the holes can be sealed and filled to the extend required by EPA and other agencies. The hardware will be removed by trucks when work is complete leaving the top surface nearly as it was when we started. Trees and other vegetation on the surface is mostly undisturbed during the process except for those that cover the region of a drilling.

(13) Proof of investment capacity.
What has been found is that major US investors and lenders would prefer that inventor DuBrucq had put the $48,000 she invested in AirWars’ patents since 2002 into real estate so they could properly value her holdings. Had she done so, with the economy as it is, whatever property might well be $48,000 less valuable if not in foreclosure. Berkshire Hathaway’s Warren Buffett, according to his secretary Debra Ray states on a fax returned, “Sorry – Mr. Buffett does not get involved with Patents. Does not provide Venture Capital.” Al Gore, on the other hand, working his new position at Kleiner Perkins Caufield & Byers, does not respond to requests for funding to end coal mine fires (which uses similar methods to this fuel extraction), but prefers to enhance the cash available to millionaire Musk Elon for Tesla Motors in the amount of Federal funds of $468million. Responding for Richard K. Davis, Chairman, President & CEO of U. S. Bancorp, Victoria L. Wohl, Executive Communications for Chairman Davis, states in her third paragraph, “Further, as with any business or commercial loan request, of great concern to the lender is the ability of the business to repay the debt through their cash flow source. Collateral is used as a secondary source of repayment, with liquidation of the collateral to repay the loan should the borrower default. Therefore, lenders look for collateral that can be converted to cash for repayment. Goodwill, patents etc. are typically not able to be converted to cash to repay such debts. Thus, those assets are generally not considered for collateral purposes.” Thus, in the US markets, my extensive list of patents – see Appendix A – is considered commercially worthless.

Ohio, living in the Dayton area – Ohio’s invention Capitol – only funds their chosen. Professors are not well versed in advantages of inert gases, especially Nitrogen. And working to sell an aviation related patent to Boeing Company through John J. Tracy, VP Operations, technology and such, finds the inventions they consider are all team in-house developments.

Venture Capitalists don’t get the idea and university people are not about to admit missing such basic science as is in these patents. Angel investors are not looking for another GE.
Earlier work by Donald B. Harper for Fuel Harvest, Inc., who lost the license on DuBrucq patents for not carrying the patent costs as agreed, put 90% of his efforts in getting oil and gas entities to work these techniques – rather like giving the battle plan to the enemy – even proved unsuccessful.

Because the evaluation process will take several months and AirWars has established CryoRain Inc. to do the legwork on the proposals, we anticipate some ARRA type contracts to clean up the environment working leaking underground storage tank cleanup, dioxin removal from soils, will bring enough income to give some sustainability. Since, once operational, the sale of fuels will carry the process, the entry should not be over $2,000,000. The shares available unassigned in CryoRain Inc. – with ticker tape letters CRYR – can enable investment.

Sami Dahlawi, my second agent to take our 1991 team to Kuwait to work to get into the field controlling their oil well fires set by the Iraqis, soon thereafter called and asked what I do. I told him I was an inventor. He asked for a business plan of 3 pages. I sent it and ended up at his attorney’s office in NYC the next week. November 21, 1991 we had an agreement and I was funded for my electronics development. Then he told me he was asked by Secretary Mikhail Gorbachev to inspect Soviet oil fields. I told him he had to bring a solution to the then current food crisis. He agreed and asked for a 2-page concept paper. I sent it. He presented it in all eleven locations he visited. While he was there, the Soviet Union disintegrated into CIS Nations. When he returned, he stated that the food program was exceeding well received and asked that I expand it to four pages. He had it translated into Russian and he sent it by diplomatic pouch to each President of the new CIS Nations and the Mayor of Moscow. I received seven replies at my Washington Street apartment in West Allis, Wisconsin – one from President Nazarbaev of Khazakstan, one from the President of Kyrgystan, and the three Prime Ministers of the other three Asian Nations, the Prime Minister of the Ukraine asking “who the hell am I” and the Mayor of Moscow. President Nazarbaev, anticipating his May 17, 1992 meeting at the White House with President G. H. W. Bush, wrote he was sending a team over to negotiate an international corporation to provide the food program. They came. We negotiated. He took the agreement to the White House on schedule. I brought a team to Kazakhstan to design the project. Their advance team came that August. Greece, Union of South Africa and Saudi Arabia agreed to work with the USA on this project. Fleming Companies, Inc., ConAgra, and several smaller companies joined us. But the US turned down the proposal. Europeans, I understand, saw the plans and helped develop a capitalistic food distribution system. There were no more funds for the electronics.

Last summer I met with Sami and he learned of the Liquid Nitrogen work. He contacted me regarding the November 30, 2009 flooding in Jeddah asking what we could do to keep accumulated sewage from flooding the city. He is guiding AirWars’ proposal to empty the sewage collection cryogenically which converts organics to fuels and freezes the water until the brine is too heavy and then solar evaporates the waters collecting the salts and urea. If Mr. Dahlawi, who has shown such skill before in security government attention, gets tapped by the Royal Family for this project, from what was bid, AirWars Defense lp and CryoRain Inc., set up to take on this effort as well, should be quite self-sufficient and able to afford the expansion into oil shale fuel extraction.

My Boston contingent feels they have the contacts to get not only funding but staffing for the project by the time needed. The AirWars Defense lp Capabilities Statement in Appendix B gives an overview of the range of activities the patents provide this developing industry.

As for the value of our one issued patent, USP 7,631,506, it provides AirWars Defense lp and its licensors with 17 years less the two weeks since issue – until December 16, 2026 – exclusive use of the ground cooling used here, in coal mine fire control and remediation work. It also makes exclusive the above ground use of sieve use in evaporating Nitrogen for both fire control and freezing including closed system uses as freezing levees when threatened with flood and hurricane situations and air dropping Liquid Nitrogen. We have pending patents that when issued will extend this exclusive use period for the specific applications.
(14) A description of the commitments of partners, if any. AirWars Defense lp will provide a letter of commitment for both use of the patent technology and participation of the partners as appropriate to CryoRain Inc. As Managing General Partner, the agreements are signed allowing my decisions to hold without further discussion.

(15) A statement from a surety qualified to furnish bonds to the United States Government of the bond amount for which the applicant qualifies under the surety's underwriting criteria. Speaking with Bob Jacobson, a surety bondsman in the Charlotte NC area, he stated that unless it is known what the bond requirement or amount is, it is not possible to know if either or both companies qualify. I will say that AirWars Defense lp has had no bonding experience and CryoRain Inc. is in the incorporating process in Delaware. There may be an answer in the months to come, but the criteria for the bonding must be known before this question can be answered appropriately.

(16) A nonrefundable application fee of $6,500.00. Having discovered on December 23, 2009 on a aircraft to my childrens' homes in Baltimore that the BLM Lease Nominations were due, not mid January as I had thought, but on the first Monday of the new year, I have several sources arranged for providing this cash amount, but no secure notice that it will be in the bank on January 4, 2010. Please notify me before cashing this or let me know where I can call to let you know the check is clear to cash.

(17) Information that demonstrates the potential to:

(a) Minimize water usage: The DuBrucq process takes no water to run. Rather it uses Nitrogen gas as the solvent which carries the fuels to the surface and through the condenser. The crew works 24/7 and has 52 members for each 18 acre, nine zone area. They will need water for drinking and depending on what is done for toilet facilities, there may be this usual use were it an office or home. The water cutter drill, if used, will recycle some 18 barrels of water needed to drill holes.

(b) Protect surface and subsurface waters: The fuel extraction system on the surface is a closed operation not letting any material escape until it reaches the barrel or container it should be transported from the scene in. There is one exception, the distilled water separated from light gasoline. This can be contained and sold for industrial purposes or “salted” and released into the environment under EPA scrutiny.

Subsurface waters are frozen if they are in the currently active extraction zone. Once trapped in the zone, the waters are evaporated with the heat treatment when that comes and condensed as distilled water in the processing of the released fuels. The Nitrogen gas carries the water along with the fuels into the condensing system dropping them when they condense into liquids as the temperature cools as the output of the central drilling passes down the condenser. That water is treated as described in the previous paragraph – sold industrially or “salted” and released under EPA supervision.

(c) Minimize life cycle greenhouse gas emissions and air pollution, including fugitive dust emissions: As the extraction process is sealed, no fuel or even Oxygen and Argon escapes from the system. However, where we may burn Methane to run generators and heat quarters on the site, the exhaust can be fed into the greenhouses during the day and the artificially lit growing areas at night. Since we use Nitrogen, the largest component of the air at 78%, that is the only emission that might be let fly after running it through the cryogenic storage tank before releasing it to capture some of the Nitrogen as liquid. Dust emission will not emerge from the drilling operations. However, road traffic to bring empties and take away filled fuel containers will happen. The roadways for this can be treated to reduce dust emissions.

(d) Capture and use natural gas onsite: The condensing system includes combined or individual natural gas component collection. Neighboring with EnCana will give AirWars-
CryoRain a possible market for these gases in that they can collect our output and put it with theirs to take to market. If not, we can liquefy it and fill pressure cylinders or ship it cryogenically.

(e) **Employ carbon capture and sequestration technology:** AirWars’ gas stack scrubber technology will be used in fuel use situations throughout the extraction areas. This carries the added benefit of greenhouse gardening so year around vegetables, fruits, and roots and flowers can be provided to the crew, our neighbors and even shipped to communities and farms.

(f) **Employ renewable energy and energy efficient technologies:** If it is cheaper to power our heaters with solar cells, that can be considered. However, since Methane is so hard to contain liquefying at such a low temperature, it may be that burning it to generate the needed electric power and heat needed for the area is a better plan.

(g) **Avoid and minimize impact on wildlife and habitat:** There will be considerably less buildout of the sites employing the DuBrucq methods of fuel extraction than occurring on farms, there should be little hindrance to the normal life efforts of wildlife. We put together a graphic illustrating the full zone showing disturbances of the surface structure and it follows:

Two Acre Extraction Zone – three layers deep so far.
Note: One fuel fractionating location at main shaft.
Five surrounding supplemental heating rings.
One outer freeze ring to keep out ground water.
Two layers have had fuel extracted, the third near completion.

(h) **Minimize surface disturbance for roads and infrastructure/facilities:** Two choices do help along this train of thought: selecting a test area close to County Road #5 and CR 24 so most of the traffic serving the location is on already existing roadways; and, two, needing only one road in to the center of each two acre extraction zone. All auxiliary drilling work can be handled by foot or light overland vehicle not needing roads.

May this effort on the part of AirWars Defense lp and the new CryoRain Inc. be acceptable to the Bureau of Land Management for allowing oil shale land leasing for this RD&D Program and, in the future with success here, the full 50,000 acre allowance of such lands in the West.

Sincerely,

Denyse DuBrucq   EdD   Inventor
Appendices

A  List of Patents

B  AirWars Defense Ip Capability Statement