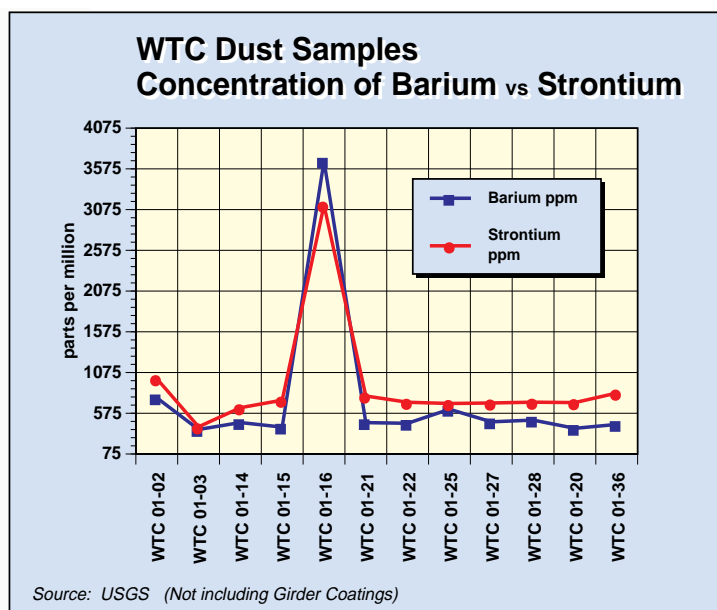

Ground Zero: The Nuclear Demolition of The World Trade Centre

Incontrovertible Proof that the World Trade Centre was destroyed by
Underground Nuclear Explosions



by

William Tahil, B.A.

*Ground Zero: the point on the ground directly under the explosion of a nuclear
weapon.*

William Tahil asserts his moral right to be identified as the author of this work.

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This report is dedicated to
All those who are striving to keep the Light
of Truth, Liberty and Justice
Alive during these Dark Hours

Salus populi suprema lex est

New York September 17th 2001

Radioactive Dust Chokes the Air of Manhattan



From the Front Cover of the Sierra Club report "Pollution and Deception at Ground Zero"

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Preface

On the 11th September 2001 at 09:59 and 10:28 EDT, two enormous explosions pulverised to dust the Twin Towers of the World Trade Centre in New York. The 400 metre high towers disintegrated in a volcanic eruption of dust and rubble before the eyes of the entire world.

The buildings were “smulched into a smouldering pit” where temperatures remained so hot that soil, concrete and glass continued to be vaporised for over 6 weeks.

Never before or since in the history of modern construction has a steel framed building collapsed due to a fire.

In the aftermath of the collapse, a team of US Geological Survey scientists collected samples of dust from 35 locations in Lower Manhattan where it came to rest from the enormous pyroclastic dust cloud that enveloped the city.

In the dust, they found high levels of chemical elements that had no business being there. Extremely rare and toxic elements. Elements such as Barium, Strontium, Thorium, Cerium, Lanthanum, Yttrium. Even some elements that only exist in radioactive form.

These elements are forensic evidence of the event that caused the disintegration of the towers. They form a distinctive hallmark and signature of a certain well known chemical process.

Nuclear Fission.

What was the enormous source of energy that caused the destruction of the WTC? It was not a few thousand gallons of jet fuel. It was not even a few thousand pounds of conventional explosives. It was a Nuclear Explosion. Two Nuclear Explosions.

But even more than that, these were not just atomic bombs. The explosions were caused by the deliberate core meltdown of two clandestine nuclear reactors buried deep beneath the towers.

The true perpetrators of this heinous act of terrorism must be brought to justice. Lest we forget, not one person has yet been held to account for their involvement in this act. Not only were 3,000 people vaporised that day - thousands of others were subjected to intense radioactive fallout and the entire population of New York is being callously used as unwitting guinea pigs in a massive radiation exposure "experiment".

The existence of these crimes against humanity and the planet must be exposed and the real perpetrators apprehended.

New York, 9/11/01 was just one in a sequence of these deliberate radiation exposure crimes. Kosovo, Afghanistan and Iraq have all been heavily contaminated with Depleted Uranium weaponry. The very genetic future of the peoples of these regions is under attack and in some cases destroyed.

Where will be the next target of this Nuclear Madness if they are not stopped?

1

Introduction

This report presents incontrovertible evidence that the Twin Towers of the World Trade Centre were destroyed by Nuclear Explosions.

The main explosive source was a nuclear device located in the basement of each tower, tightly coupled to its foundation structure.

The incontrovertible proof that the towers were subjected to a nuclear explosion is the presence of very high concentrations of the elements Strontium and Barium in dust samples from the WTC collapse. Many other characteristic products of nuclear fission are also present to corroborate this. These samples were collected and analysed by the US Geological Survey.

Strontium and Barium found together in closely related concentrations is the signature of Nuclear Fission.

No other explanation can account for the presence of the large quantities of Barium and Strontium discovered, in high concentrations that vary in lockstep with each other at the different locations where dust was collected across lower Manhattan.

The nuclear device under each tower was not an atomic bomb. The evidence indicates that it was a clandestine nuclear reactor that was caused to run out of control and enter an uncontrolled chain reaction, followed by a core meltdown, similar to the Chernobyl disaster in 1986.

This report presents the detailed evidence which proves beyond a shadow of a doubt that each Twin Tower of the WTC was destroyed by a nuclear explosion.

2

Sources of Information

The report draws largely on the following sources of data and information:

1. The chemical analysis of dust fallout samples from the WTC rubble which covered Lower Manhattan after the collapse. This analysis was performed by the US Geological Survey.
2. The seismographic data recorded by the Lamont-Doherty Earth Observatory at the time the towers collapsed and its comparison to known underground nuclear blast seismograms from the Lawrence Livermore National Laboratory.
3. The Satellite Thermal Imaging of the WTC site carried out by the USGS and eyewitness accounts of elevated debris temperatures and pools of molten steel under the WTC.
4. The investigation and analysis of continual fallout from the WTC site in the weeks following the collapse. This was carried out by the DELTA Group led by Dr. Thomas Cahill, expert in atmospheric sciences at the University of California Davis.
5. Comparison of known Underground Nuclear Blasts with photographs of the WTC collapse.
6. An eyewitness account of the core meltdown at the Chernobyl nuclear reactor and comparison to events at the WTC.

Other documentary sources of information were also used as appropriate. These are referenced when quoted.

Data on the radioactive isotopes of the elements was sourced from "The Elements", John Emsley, OUP, Third Edition 1999.

This report aims to present the scientific evidence that the WTC was destroyed by a nuclear explosion in as non-technical a way as possible for a non-specialist audience. Where possible, I have explained the background physics and chemistry involved. Where mathematics has been used, the average reader should be able to follow it without difficulty.

3

Evidence of Radioactive Fallout

3.1 Introduction

The most important evidence that the WTC was subjected to nuclear explosions is the presence of distinctive radioactive fallout in the dust that enveloped New York. Before we examine that dust and the evidence that it was indeed contaminated with nuclear fallout, it will be useful to first look at what takes place in a nuclear reactor or atomic bomb. This chapter explains how radioactive fallout is produced, *what distinctive substances are produced as a characteristic signature of nuclear fission* and then goes on to compare that to what was actually found in the dust.

3.2 The Chemistry of Nuclear Fission

Nuclear fission is quite a complex subject and scientists have developed sophisticated computer models to try and predict what will actually happen when a bomb is detonated or a reactor "goes live". But the essential idea relevant to what we are going to present is that a chemical element, i.e. Uranium, turns into other elements in a very distinctive way, releasing energy as it does so. This leaves behind a *distinctive forensic trail* which provides irrefutable evidence of the type of chemical reaction that produced it - Nuclear Fission.

Isotopes

The nucleus of an atom contains two types of particle: neutrons and protons. The number of protons determines the chemical element - i.e. whether it is an atom of carbon, iron, uranium or something else. The number of protons is called the *Atomic Number* and has the symbol Z . The sum of the number of protons and neutrons is called the *Atomic Weight* of the element. If the number of protons changes, the element changes into a different element. However, if the number of neutrons changes while the number of protons stays the same, the element remains chemically unchanged - it is still the same element, although the weight of its nucleus has changed, as well as its radioactive properties.

Atoms of the same element with different numbers of neutrons are called *isotopes* of that element.

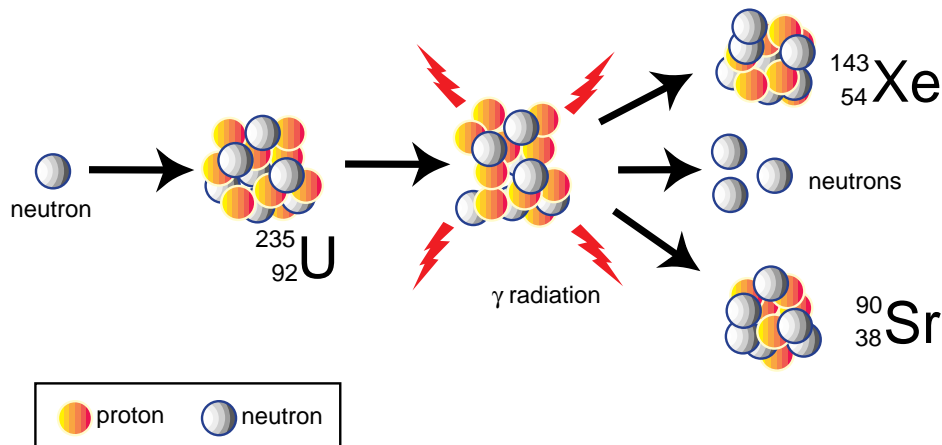
Different isotopes of Uranium for example therefore have the same number of protons as each other but different numbers of neutrons. Different isotopes have different stability and radioactive half lives. The two main isotopes of Uranium are Uranium 235 and Uranium 238. The numbers 235 and 238 tell us the *atomic weight* of each isotope: since the number of protons has to be the same in each, we can see that U238 has three more neutrons in its nucleus than U235.

In the nuclear fission reaction used to generate electrical power or to explode an atomic bomb, atoms of the Uranium 235 isotope are bombarded with neutrons. These neutrons "split the atoms" of Uranium 235 into two smaller pieces - i.e. into two smaller atoms which by definition will be atoms of elements different to Uranium. In the process, a large amount of energy is released which can either be used for destructive purposes in a bomb or constructive purposes in a nuclear reactor.

Figure 1 shows one of the most common reactions that occurs when Uranium 235 is fissioned. The Uranium atom, with 92 protons, splits into two atoms, one of Strontium 90 with 38 protons and one of Xenon 143 with 54 protons.

FIGURE 1

NUCLEAR FISSION OF URANIUM



In Figure 1, there are therefore two numbers next to each element. The bottom number is the number of protons which defines that element for what it is. Uranium will always have 92 protons, Strontium will always have 38 protons and so on.

The upper number is the atomic weight of the atom and is the sum of the number of protons and neutrons in the nucleus. Therefore this is the number that will change when neutrons are added or removed to create different isotopes. U235 and U238 are different isotopes of Uranium with different radioactive properties. U238 has 3 more neutrons than U235.

Protons are *positively* charged, neutrons are *neutral* and electrons are *negatively* charged.

We will see how this accounts for what was found in the WTC dust later.

Fission and Decay Pathways

Unlike a standard chemical reaction in a test tube, a whole range of elements is produced when an atom of Uranium undergoes fission. However, nuclear fission tends to favour certain “pathways” over others and much more of some distinctive elements is created than others. Two of the most common and distinctive elements produced are Barium and Strontium.

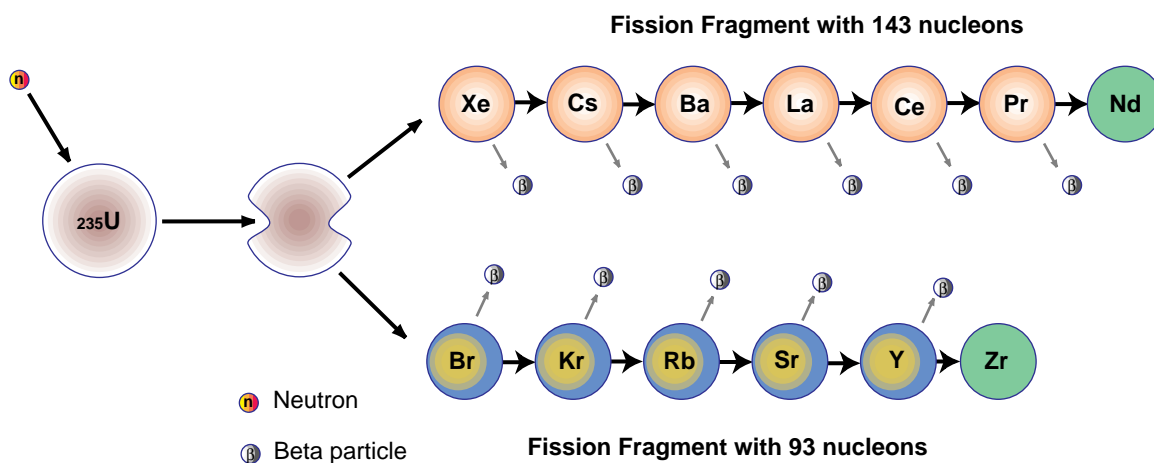
These two elements are the signature of Nuclear Fission.

Therefore the two most important “pathways” for Uranium fission lead to Barium and Strontium. Nuclear fission was in fact first discovered by Otto Hahn in the 1930s because he found Barium in a Uranium sample after he had bombarded it with neutrons. The uptake of Strontium into children’s milk teeth has been used to monitor the fallout from atmospheric atomic bomb tests since the 1960s. Strontium displaces Calcium in teeth and bones.

The diagram below shows these two major pathways in more detail.

FIGURE 2

FISSION AND DECAY PATHWAYS



When a Uranium atom is hit with a neutron, it *fissions* or splits into two "Fission Fragments" - unstable isotopes of Xenon and Bromine. These in turn *decay* relatively quickly to Barium and Strontium. Barium and Strontium in turn have longer half lives and decay relatively slowly, so they will persist in fallout for some time. Over a longer period, the Barium and Strontium will then decay until a stable isotope of Neodymium and Zirconium is reached, when radioactive decay stops.

One of the main energy releasing reactions in a nuclear reactor or bomb is often shown as follows:

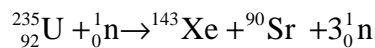
(EQ 1)



In this nuclear fission reaction, a Uranium atom is split into Barium and Krypton gas. (We can see this in Figure 2 above. Barium is the third decay element in the top row, Krypton is the second decay element in the bottom row). 200MeV (mega electron volts) of energy are also released. This energy is used in the reactor to heat water to produce steam to then drive a turbine and generate electricity.

Another main fission reaction is often shown as:

(EQ 2)

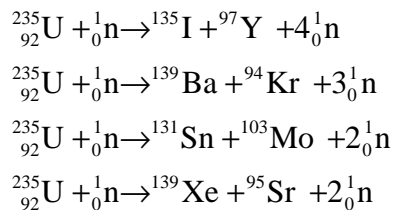


The Barium and Strontium and other elements produced are themselves radioactive and therefore decay with time into yet other elements, which leaves more “forensic evidence” that nuclear fission has occurred. This is shown above in Figure 2.

Many other pathways occur as well but those shown in Figure 2 are two of the most important.

Some of the other common fission reactions of Uranium are shown below:

(EQ 3)



When the USGS collected and then analysed the dust samples, they would still be radioactive - and indeed, still are today. Over time, the quantity of each element present will change as it decays into its “daughter product” further down the pathway, until a stable element is reached. We will see the signature of this in some of the dust samples.

In the pathway diagram above, we see that the Uranium atom splits into two pieces. These decay via Barium on the one hand and Strontium on the other. We will see when we look at the USGS data that the daughter products of Barium (Lanthanum and Cerium) and of Strontium (Yttrium) are also present in the dust in statistically significant quantities.

Decay Mechanisms

These Decay Pathways are complicated by the fact that different radioactive isotopes of each element are formed when the original Uranium atom fissions and these isotopes in turn decay in different ways.

The most important decay mechanisms are:

1. Electron emission or beta particle emission. Beta particles are negatively charged, very low weight particles. They are denoted as β^- in nuclear chemistry. Electron emission increases the atomic number (Z) by one.
2. Positron emission - these are positively charged electrons or beta particles. They are shown as β^+ and positron emission decreases the atomic number by one.
3. Electron capture (EC) - the nucleus absorbs an electron or beta particle, also decreasing the atomic number by one.
4. Alpha particle emission. An alpha particle (α) is a Helium nucleus containing 2 protons and 2 neutrons. When an alpha particle is emitted the atomic number of the nucleus therefore falls by two and the atomic weight falls by four.

What does all this mean?

Look at the Periodic Table in Figure 3 and find Xenon with Atomic Number 54 on the right hand side.

We have already seen (Figure 2) how Xenon decays into Caesium, Barium, Lanthanum etc. by beta particle emission. Each time this happens, the Atomic Number of the atom increases by one and the element changes into the next higher element in the Periodic Table.

How does this happen?

Remember, the nucleus consists of positively charged protons and neutral neutrons. The neutron can be thought of as being a combination of a positive proton and a negative electron. When a negative electron is emitted, a neutron loses a negative charge and becomes a positive proton - so the Atomic Number Z increases by one and the element changes. The weight hardly changes at all though, since electrons have negligible mass compared to protons and neutrons.

However, some isotopes of Xenon do not decay by beta emission: they change by emitting positrons or even by Electron Capture - they absorb beta particles. When this happens, a proton in the nucleus becomes neutralised by absorbing an electron and turns into a neutron; the Atomic Number therefore falls by one instead of increasing. Some isotopes of the daughter products of Xenon produced by this mechanism also absorb electrons and so continue decaying or transmuting in the same way.

FIGURE 3

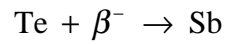
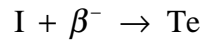
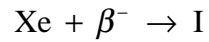
PERIODIC TABLE OF THE ELEMENTS

Periodic Table of the Elements

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| 1 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| H | He | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Li | Be | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Na | Mg | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| K | Ca | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 37 | 38 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rb | Sr | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 55 | 56 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cs | Ba | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 87 | 88 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fr | Ra | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | 6 | 7 | 8 | 9 | 10 | | | | | | | | | | | | | | | | | | | | | | | | |
| B | C | N | O | F | Ne | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | 14 | 15 | 16 | 17 | 18 | | | | | | | | | | | | | | | | | | | | | | | | |
| Al | Si | P | S | Cl | Ar | | | | | | | | | | | | | | | | | | | | | | | | |
| 31 | 32 | 33 | 34 | 35 | 36 | | | | | | | | | | | | | | | | | | | | | | | | |
| Ga | Ge | As | Se | Br | Kr | | | | | | | | | | | | | | | | | | | | | | | | |
| 49 | 50 | 51 | 52 | 53 | 54 | | | | | | | | | | | | | | | | | | | | | | | | |
| In | Sn | Sb | Te | I | Xe | | | | | | | | | | | | | | | | | | | | | | | | |
| 81 | 82 | 83 | 84 | 85 | 86 | | | | | | | | | | | | | | | | | | | | | | | | |
| Tl | Pb | Bi | Po | At | Rn | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | | | | | | | | | | | | | | | | | | | | |
| Sc | Ti | V | Cr | Mn | Fe | Co | Ni | Cu | Zn | | | | | | | | | | | | | | | | | | | | |
| 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | | | | | | | | | | | | | | | | | | | | |
| Y | Zr | Nb | Mo | Tc | Ru | Rh | Pd | Ag | Cd | | | | | | | | | | | | | | | | | | | | |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | | | | | | | | | | | | | | | | | | | | |
| Lu | Hf | Ta | W | Re | Os | Ir | Pt | Au | Hg | | | | | | | | | | | | | | | | | | | | |
| 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | | | | | | | | | | | | | | | | |
| La | Ce | Pr | Nd | Pm | Sm | Eu | Gd | Tb | Dy | Ho | Er | Ym | Yb | | | | | | | | | | | | | | | | |
| 89 | 90 | 91 | 92 | 93 | 94 | | | | | | | | | | | | | | | | | | | | | | | | |
| Ac | Th | Pa | U | Np | Pu | | | | | | | | | | | | | | | | | | | | | | | | |

Therefore we will see something like this:

(EQ 4)



This produces elements such as Iodine, Tellurium and Antimony.

So Xenon (and Bromine and Krypton in the Strontium pathway) will decay in two directions - or more precisely, the different isotopes of Xenon, Krypton etc. decay in two directions: one towards elements of higher atomic number and one towards elements of lower atomic number.

We will see in the data how there sometimes appear to be *two* relationships between elements in the dust - as one element increases in concentration another appears to both increase and decrease. This can be explained by these two opposing radioactive decay mechanisms.

Half Life

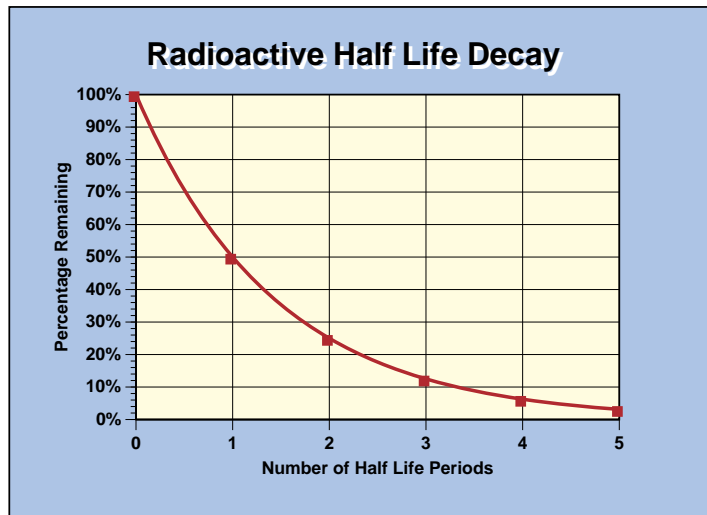
The other piece of nuclear chemistry we will find useful later on is the concept of half life.

Different radioactive isotopes take varying amounts of time to decay away into the next element along the chain. The time it takes for half the atoms in a sample of a particular isotope to decay is called the *half life* of that isotope. Sr90 has a half life of about 28 years.

This is illustrated in the graph below: after one half life period, 50% of the original amount remains; after two half life periods, 25% remains and so on.

FIGURE 4

RADIOACTIVE HALF LIFE DECAY



The formula for this radioactive decay is:

(EQ 5)

$$\frac{N}{N_0} = e^{-\lambda t}$$

where t is the elapsed time, N_0 is the original number of atoms present at time $t=0$, N is the number of atoms left at time t and λ is a constant.

For the half life, $N/N_0 = 0.5$. From this, the Radioactive Decay Constant λ can be calculated for each isotope if we know the half life time, t_{half} .

We can then use λ to calculate how much of an isotope must have decayed away in any time t we choose.

3.3 The USGS Data

The incontrovertible evidence that the WTC was brought down by nuclear explosions is contained in an analysis of the dust fallout from the buildings carried out by the United States Geological Survey.

In the aftermath of the collapse, a USGS team took representative samples of the dust from 35 locations in Lower Manhattan near the site of the WTC. This included samples from two indoor sites (in local buildings) and two samples from the insulation coatings of girders used in the construction of the towers.

Their report entitled "**Environmental Studies of the World Trade Centre area after the September 11, 2001 attack**" was published on the USGS website¹, with classification Open File Report OFR-01-0429, Version 1.1, Published November 27, 2001.

The introduction to the report describes its context as follows:

"The information in this report describes the results of an interdisciplinary environmental characterization of the World Trade Center (WTC) area following requests from other Federal agencies after the attack on September 11, 2001. The scientific investigation included two main aspects: 1) imaging spectroscopy mapping of materials to cover a large area around the WTC and 2) laboratory analysis of samples collected in the WTC area."

The spectroscopic imaging was carried out by the airborne infra-red system AVIRIS, which we will come back to later.

Sample Collection Procedure

The USGS described the sample collection procedure² as follows:

"Sample Collection in the World Trade Center Area, Sept. 17-18, 2001"

"A 2-person USGS crew collected grab samples from 35 localities within a 0.5 -1 km radius circle centred on the World Trade Centre site on the evenings of September 17 and 18, 2001 (see sample collection map, below)."

"Many of the streets bordering the collection locations were cleaned or were in the process of being cleaned at the time of sample collection. Given this limitation, collection of dust samples was restricted to undisturbed window ledges, car windshields, flower pots, protected areas in door entry ways, and steps. Occasionally, samples were collected from the sidewalk adjacent to walls that were afforded some

1. <http://pubs.usgs.gov/of/2001/ofr-01-0429/index.html>

2. <http://pubs.usgs.gov/of/2001/ofr-01-0429/sample.location.html>

degree of protection from the elements and cleanup process. In many cases the samples formed compact masses suggestive of having been dampened by rain and having dried in the intervening 3 - 4 days. Two samples of an insulation coating (WTC01-8 and WTC01-9) were collected from steel girders recently removed from the debris pile of the WTC. Samples were gathered by nitrile-gloved hand and put into doubled plastic sample bags (sample bag in another sample bag). Initially, Global Position Satellite (GPS) locations were collected for the sample collection locations, but this approach was abandoned because of difficulty in acquiring a satellite signal between tall buildings. Instead, sample locations were identified using road intersections where road signs remained intact. All but two of the samples were collected outdoors and had been subjected to wind and water during a rain storm the night of September 14. One sample (WTC01-20) was collected indoors near the gymnasium in the World Financial Centre directly across West Street from the World Trade Centre. Samples of concrete (WTC01-37A and WTC01-37B) were collected from the WTC debris at the same location as WTC01-9. A sample of dust (WTC01-36) blown by the collapse into an open window of an apartment located 30 floors up and 0.4 km from the centre of the WTC site was also acquired a few days later. "

<http://pubs.usgs.gov/of/2001/ofr-01-0429/sample.location.html>

The USGS map of the sampling locations in Manhattan is reproduced in Figure 36 on page 59.

Chemical Analysis

The report then gives a detailed chemical analysis of the dust samples.

The table of data is reproduced below¹.

1. nm means data was not measured from that sampling location.
2. % means percentage of the sample by weight
3. ppm means parts per million of the sample by weight.
4. 1 ppm = 0.0001% or 1% = 10,000 ppm

1. <http://pubs.usgs.gov/of/2001/ofr-010429/chem1/WTCchemistrytable.html>

TABLE 1 OUTDOOR DUST SAMPLES

| | Outdoor Dust Samples | | | | |
|----------------|-----------------------------|-----------|-----------|-----------|-----------|
| Location | WTC 01-02 | WTC 01-03 | WTC 01-05 | WTC 01-06 | WTC 01-14 |
| Silicon% | 21.2 | 26.3 | 11.4 | 11.4 | 15.3 |
| Calcium% | 15.01 | 9.58 | 20.94 | 20.58 | 7.65 |
| Magnes.% | 3.11 | 2.23 | 2.73 | 2.73 | 2.83 |
| Sulphur% | 1.33 | nm | 0.87 | nm | nm |
| Iron % | 4.13 | 2.16 | 1.41 | 1.42 | 1.87 |
| Aluminium% | 4.13 | 2.75 | 2.75 | 2.73 | 2.86 |
| C (organic) % | 0.98 | 3.55 | nm | nm | 3.08 |
| C (CO3)% | 1.24 | 1.63 | nm | nm | 1.46 |
| Sodium % | 0.82 | 0.76 | 0.50 | 0.50 | 0.59 |
| Potassium % | 0.63 | 0.69 | 0.46 | 0.47 | 0.56 |
| Titanium % | 0.39 | 0.25 | 0.24 | 0.24 | 0.31 |
| Manganese % | 0.15 | 0.08 | 0.10 | 0.10 | 0.12 |
| Phosphor. % | 0.03 | 0.05 | 0.03 | 0.03 | 0.02 |
| Ignition Loss% | 7.96 | 13.6 | 19.6 | 19.6 | 18.1 |
| Barium ppm | 765 | 376 | nm | nm | 461 |
| Strontium ppm | 1000 | 409 | nm | nm | 643 |
| Zinc ppm | 2990 | 1200 | nm | nm | 1570 |
| Lead ppm | 710 | 176 | nm | nm | 276 |
| Copper ppm | 438 | 142 | nm | nm | 242 |
| Cerium ppm | 108 | 50.9 | nm | nm | 68.8 |
| Yttrium ppm | 58.9 | 30.2 | nm | nm | 46.5 |
| Cr ppm | 224 | 98 | nm | nm | 116 |
| Nickel ppm | 88.4 | 30.8 | nm | nm | 28.6 |
| La ppm | 51 | 25.8 | nm | nm | 34.8 |
| Antimony ppm | 52.1 | 26.3 | nm | nm | 40.2 |
| Vanadium ppm | 38.8 | 42.5 | nm | nm | 30.6 |
| Mo ppm | 25.4 | 14.5 | nm | nm | 19.1 |
| Lithium ppm | 27.4 | 17.4 | nm | nm | 23.2 |
| Thorium ppm | 11.2 | 5.56 | nm | nm | 7.92 |
| Rubidium ppm | 21.2 | 23.7 | nm | nm | 25.2 |
| Cobalt ppm | 13.9 | 8.4 | nm | nm | 7.1 |
| Niobium ppm | 11 | 7.8 | nm | nm | 9.1 |
| Scandium ppm | 8.8 | 6.6 | nm | nm | 6.1 |
| Uranium ppm | 3.92 | 1.96 | nm | nm | 2.89 |
| Cadmium ppm | 7.3 | 3.2 | nm | nm | 3.4 |
| Arsenic ppm | 6.8 | 3.7 | nm | nm | 5.1 |
| Gallium ppm | 6 | 5.4 | nm | nm | 4.1 |
| Beryllium ppm | 3.7 | 2.2 | nm | nm | 2.9 |

TABLE 1 OUTDOOR DUST SAMPLES

| | Outdoor Dust Samples | | | | |
|----------------|----------------------|-----------|----------|-----------|-----------|
| | WTC 01-15 | WTC 01-16 | WTC01-17 | WTC 01-21 | WTC 01-22 |
| Silver ppm | 1.2 | 3.8 | nm | nm | 1.2 |
| Caesium ppm | 0.73 | 0.76 | nm | nm | 0.88 |
| Bismuth ppm | 0.5 | 0.68 | nm | nm | 0.56 |
| Thallium ppm | 0.1 | 0.13 | nm | nm | 0.11 |
| | | | | | |
| | WTC 01-15 | WTC 01-16 | WTC01-17 | WTC 01-21 | WTC 01-22 |
| Silicon % | 13.6 | 17.0 | 16.0 | 12.8 | 17.0 |
| Calcium % | 18.58 | 13.36 | 17.01 | 18.94 | 16.80 |
| Magnesium % | 2.64 | 1.79 | 2.06 | 2.68 | 2.77 |
| Sulphur % | 5.40 | 3.68 | nm | 5.10 | 3.70 |
| Iron % | 1.87 | 1.92 | 1.71 | 1.49 | 2.78 |
| Aluminum % | 2.59 | 2.27 | 2.30 | 2.73 | 2.78 |
| C (organic) % | 2.30 | 2.51 | nm | 4.02 | 2.55 |
| C (CO3) % | 1.48 | 1.47 | nm | 1.44 | 1.31 |
| Sodium % | 0.66 | 0.87 | 0.93 | 0.50 | 0.83 |
| Potassium % | 0.49 | 0.69 | 0.54 | 0.50 | 0.52 |
| Titanium % | 0.25 | 0.26 | 0.25 | 0.24 | 0.29 |
| Mn % | 0.10 | 0.07 | 0.07 | 0.12 | 0.12 |
| P % | 0.03 | 0.02 | 0.02 | 0.03 | 0.03 |
| Ignition Loss% | 17.3 | 22.8 | 15.9 | 21.2 | 15.3 |
| Barium ppm | 405 | 3670 | nm | 460 | 452 |
| Strontium ppm | 736 | 3130 | nm | 787 | 710 |
| Zinc ppm | 1110 | 1410 | nm | 1500 | 1380 |
| Lead ppm | 152 | 208 | nm | 278 | 452 |
| Copper ppm | 367 | 307 | nm | 153 | 130 |
| Cerium ppm | 64.9 | 132 | nm | 77 | 72 |
| Yttrium ppm | 46.1 | 31.4 | nm | 54.5 | 47.6 |
| Cr ppm | 129 | 95.2 | nm | 104 | 111 |
| Nickel ppm | 32.9 | 31.4 | nm | 31.2 | 30.6 |
| La ppm | 32.7 | 69.9 | nm | 38.6 | 35.4 |
| Antimony ppm | 30.2 | 148 | nm | 33.1 | 27.5 |
| Vanadium ppm | 27.1 | 24.9 | nm | 27.9 | 29.7 |
| Mo ppm | 12.1 | 10 | nm | 9 | 6.9 |
| Lithium ppm | 22.1 | 18 | nm | 23.3 | 23 |
| Thorium ppm | 7.3 | 5.36 | nm | 8.48 | 8.5 |
| Rubidium ppm | 21.6 | 21.6 | nm | 21 | 21.1 |
| Cobalt ppm | 6.5 | 6.5 | nm | 5.3 | 6.3 |
| Niobium ppm | 7.6 | 6.6 | nm | 9 | 9.2 |
| Scandium ppm | 5.9 | 4.4 | nm | 6.2 | 6.2 |
| Uranium ppm | 2.71 | 2.3 | nm | 3.16 | 3.09 |

TABLE 1 OUTDOOR DUST SAMPLES

| | Outdoor Dust Samples | | | | |
|----------------|----------------------|-----------|-----------|----------|----------|
| Cadmium ppm | 4 | 3 | nm | 4.6 | 3.8 |
| Arsenic ppm | 4 | 4.3 | nm | 3.6 | 6.6 |
| Gallium ppm | 3.9 | 4.3 | nm | 3.9 | 4 |
| Beryllium ppm | 2.4 | 1.8 | nm | 2.9 | 2.9 |
| Silver ppm | 1.4 | 1.5 | nm | 2.4 | 1.4 |
| Caesium ppm | 0.78 | 0.87 | nm | 0.76 | 0.76 |
| Bismuth ppm | 0.25 | 0.28 | nm | 0.5 | 0.43 |
| Thallium ppm | 0.11 | 0.12 | nm | 0.1 | 0.1 |
| | | | | | |
| | WTC 01-25 | WTC 01-27 | WTC 01-28 | WTC01-30 | WTC01-34 |
| Silicon % | 13.2 | 15.2 | 13.8 | 15.1 | 12.2 |
| Calcium % | 20.37 | 19.51 | 19.65 | 19.73 | 20.51 |
| Mg % | 3.29 | 3.04 | 2.83 | 3.49 | 3.01 |
| Sulphur % | 4.03 | 4.29 | 4.56 | nm | nm |
| Iron % | 1.33 | 1.72 | 1.80 | 1.85 | 1.45 |
| Aluminum % | 3.28 | 3.05 | 2.9 | 3.59 | 2.98 |
| C (organic) % | 2.94 | 1.95 | 2.42 | nm | nm |
| C (CO3)% | 1.87 | 1.82 | 1.68 | nm | nm |
| Sodium % | 0.62 | 0.62 | 0.76 | 0.71 | 0.50 |
| Potassium % | 0.56 | 0.50 | 0.54 | 0.56 | 0.51 |
| Titanium % | 0.29 | 0.29 | 0.26 | 0.29 | 0.25 |
| Mn % | 0.15 | 0.12 | 0.12 | 0.14 | 0.12 |
| P% | 0.03 | 0.03 | 0.02 | 0.04 | 0.03 |
| Ignition Loss% | 17.5 | 14.4 | 16.7 | 17.5 | 18.5 |
| Barium ppm | 624 | 470 | 491 | nm | nm |
| Strontium ppm | 695 | 701 | 711 | nm | nm |
| Zinc ppm | 1910 | 1650 | 1720 | nm | nm |
| Lead ppm | 756 | 204 | 234 | nm | nm |
| Copper ppm | 251 | 188 | 218 | nm | nm |
| Cerium ppm | 85 | 77.7 | 75 | nm | nm |
| Yttrium ppm | 61.6 | 54.9 | 53.8 | nm | nm |
| Cr ppm | 134 | 12 | 106 | nm | nm |
| Nickel ppm | 39.2 | 39.4 | 26.1 | nm | nm |
| La ppm | 43.5 | 39.5 | 38.4 | nm | nm |
| Antimony ppm | 65.8 | 50.4 | 51.8 | nm | nm |
| Vanadium ppm | 30.5 | 30 | 28.9 | nm | nm |
| Mo ppm | 30.9 | 27.1 | 42 | nm | nm |
| Lithium ppm | 28.5 | 25.2 | 24.8 | nm | nm |
| Thorium ppm | 9.94 | 9.14 | 8.48 | nm | nm |
| Rubidium ppm | 24 | 21.7 | 22.5 | nm | nm |

TABLE 1 OUTDOOR DUST SAMPLES

| | Outdoor Dust Samples | | | | |
|---------------|----------------------|------|------|----|----|
| Cobalt ppm | 7.4 | 6.2 | 5.9 | nm | nm |
| Niobium ppm | 11 | 11 | 10 | nm | nm |
| Scandium ppm | 7.1 | 6.6 | 6.2 | nm | nm |
| Uranium ppm | 3.78 | 3.36 | 3.27 | nm | nm |
| Cadmium ppm | 7.5 | 5 | 5.2 | nm | nm |
| Arsenic ppm | 4.2 | 5 | 4.8 | nm | nm |
| Gallium ppm | 4.3 | 4.3 | 4.1 | nm | nm |
| Beryllium ppm | 3.6 | 3.2 | 3.1 | nm | nm |
| Silver ppm | 1.4 | 1.4 | 1.7 | nm | nm |
| Caesium ppm | 0.83 | 0.77 | 0.76 | nm | nm |
| Bismuth ppm | 0.67 | 0.4 | 0.48 | nm | nm |
| Thallium ppm | 0.1 | 0.09 | 0.11 | nm | nm |

TABLE 2 INDOOR DUST SAMPLES & GIRDER COATINGS

| | Indoor dust samples | | Girder coatings | |
|----------------|---------------------|-----------|-----------------|-----------|
| | WTC 01-20 | WTC 01-36 | WTC 01-08 | WTC 01-09 |
| Silicon % | 14.2 | 11.7 | 15.0 | 15.5 |
| Calcium % | 19.44 | 21.30 | 20.73 | 26.01 |
| Magnesium % | 2.59 | 2.88 | 6.94 | 3.23 |
| Sulfur % | 5.51 | 5.77 | 1.39 | 1.23 |
| Iron % | 1.25 | 1.38 | 1.25 | 0.55 |
| Aluminum % | 2.55 | 2.86 | 2.92 | 3.56 |
| C (organic) % | 2.68 | 2.32 | 2.48 | 2.45 |
| C (CO3)% | 1.27 | 1.50 | 1.89 | 1.86 |
| Sodium % | 1.16 | 0.58 | 0.12 | 0.16 |
| Potassium % | 0.46 | 0.46 | 0.28 | 0.32 |
| Titanium % | 0.25 | 0.23 | 0.21 | 0.28 |
| Mn % | 0.10 | 0.11 | 0.14 | 0.19 |
| P % | 0.02 | 0.02 | 0.01 | 0.01 |
| Ignition Loss% | 15.7 | 16.9 | 15.8 | 13 |
| Barium ppm | 390 | 438 | 317 | 472 |
| Strontium ppm | 706 | 823 | 444 | 378 |
| Zinc ppm | 1330 | 1400 | 57.4 | 101 |
| Lead ppm | 153 | 159 | 9.13 | 11.7 |
| Copper ppm | 176 | 95 | 10.3 | 12.8 |
| Cerium ppm | 61.6 | 70.2 | 202 | 356 |
| Yttrium ppm | 44.1 | 52.6 | 134 | 243 |
| Cr ppm | 94 | 107 | 153 | 86.5 |

TABLE 2 INDOOR DUST SAMPLES & GIRDER COATINGS

| | Indoor dust samples | | Girder coatings | |
|---------------|---------------------|------|-----------------|------|
| | | | | |
| Nickel ppm | 29.8 | 28.5 | 202 | 22.6 |
| La ppm | 31.3 | 35.6 | 102 | 175 |
| Antimony ppm | 38.9 | 33.9 | 0.56 | 1.2 |
| Vanadium ppm | 25 | 28.6 | 30.5 | 40.1 |
| Mo ppm | 19 | 16.1 | 0.85 | 1.2 |
| Lithium ppm | 21.9 | 24.9 | 25.2 | 36.4 |
| Thorium ppm | 7.25 | 8.64 | 17.9 | 30.7 |
| Rubidium ppm | 18.9 | 21.1 | 8 | 8.2 |
| Cobalt ppm | 5 | 5.3 | 12.3 | 1.7 |
| Niobium ppm | 8 | 9 | 4.4 | 6.3 |
| Scandium ppm | 5.4 | 6.4 | 9.2 | 9.8 |
| Uranium ppm | 2.7 | 3.23 | 4.7 | 7.57 |
| Cadmium ppm | 4.2 | 5.8 | 0.11 | 0.21 |
| Arsenic ppm | 3.5 | 3.8 | < 2 | < 2 |
| Gallium ppm | 3.6 | 4 | 2.8 | 4.2 |
| Beryllium ppm | 2.5 | 3.1 | 4 | 4.2 |
| Silver ppm | 3.5 | 1.6 | 1.8 | 0.96 |
| Cesium ppm | 0.72 | 0.78 | 0.18 | 0.22 |
| Bismuth ppm | 0.64 | 0.82 | 0.008 | 0.01 |
| Thallium ppm | 0.09 | 0.09 | 0.02 | 0.02 |

TABLE 3 SUMMARY TABLE

| Summary | Minimum | Maximum | Mean* |
|----------------|---------|---------|-------|
| Silicon % | 11.4 | 26.3 | 14.8 |
| Calcium % | 7.65 | 26.01 | 18.36 |
| Magnesium % | 1.79 | 6.94 | 2.88 |
| Sulfur % | 0.87 | 5.77 | 3.11 |
| Iron % | 0.55 | 4.13 | 1.63 |
| Aluminum % | 2.27 | 4.13 | 2.90 |
| C (organic) % | 0.98 | 4.02 | 2.48 |
| C (CO3)% | 1.24 | 1.89 | 1.55 |
| Sodium % | 0.12 | 1.16 | 0.57 |
| Potassium % | 0.28 | 0.69 | 0.50 |
| Titanium % | 0.21 | 0.39 | 0.26 |
| Manganese % | 0.07 | 0.19 | 0.11 |
| P % | 0.01 | .05 | 0.02 |
| Ignition Loss% | 7.96 | 22.8 | 16.35 |

TABLE 3

SUMMARY TABLE

| Summary | | | |
|---------------|-------|------|---------|
| Barium ppm | 317 | 3670 | 533.38 |
| Strontium ppm | 378 | 3130 | 726.61 |
| Zinc ppm | 57.4 | 2990 | 1004.70 |
| Lead ppm | 9.13 | 756 | 166.75 |
| Copper ppm | 10.3 | 438 | 136.31 |
| Cerium ppm | 50.9 | 356 | 91.23 |
| Yttrium ppm | 30.2 | 243 | 57.45 |
| Cr ppm | 86.5 | 224 | 116.61 |
| Nickel ppm | 22.6 | 202 | 37.77 |
| La ppm | 25.8 | 175 | 45.96 |
| Antimony ppm | 0.56 | 148 | 24.84 |
| Vanadium ppm | 24.9 | 42.5 | 30.67 |
| Molyb ppm | 0.85 | 42 | 11.34 |
| Lithium ppm | 17.4 | 36.4 | 24.00 |
| Thorium ppm | 5.36 | 30.7 | 9.31 |
| Rubidium ppm | 8 | 25.2 | 19.01 |
| Cobalt ppm | 1.7 | 13.9 | 6.36 |
| Niobium ppm | 4.4 | 11 | 8.34 |
| Scandium ppm | 4.4 | 9.8 | 6.63 |
| Uranium ppm | 1.96 | 7.57 | 3.29 |
| Cadmium ppm | 0.11 | 7.5 | 2.80 |
| Arsenic ppm | 3.5 | 6.8 | *** |
| Gallium ppm | 2.8 | 6 | 4.15 |
| Beryllium ppm | 1.8 | 4.2 | 2.96 |
| Silver ppm | 0.96 | 3.8 | 1.66 |
| Caesium ppm | 0.18 | 0.88 | 0.64 |
| Bismuth ppm | 0.008 | 0.82 | 0.28 |
| Thallium ppm | 0.02 | 0.13 | 0.08 |

Notes on these Tables

The data was divided by the USGS into two categories:

1. Major Elements
2. Trace Elements

The USGS classified as "Major Elements" those elements found in high enough quantities to be measured in percentage terms by weight. This included the common everyday elements that one would expect to find in building rubble as well as some other less common elements.

The USGS classified as "Trace Elements" any less common elements that were either only found in relatively small quantities or should only have been found in small quantities, if at all. They are shown in ppm by weight. 1ppm = 1mg/kg.

Summary Table

The Summary Table (Table 3) shows the Maximum, Minimum and Mean values taking into account all of the sample locations, including the indoor samples and the two girder coatings. The two girder coatings had very different characteristics to both the indoor and outdoor dust samples.

Location Identifiers

The location identifiers WTC 01-02 etc. refer to the locations in Lower Manhattan around the WTC where the USGS team took a sample. These are shown on the USGS diagram "Chemistry Figure 4" (our Figure 36 on page 59) which is supposed to show the variation in concentration of the predominant trace elements in the dust at different locations in Lower Manhattan around the WTC.

3.4 The Major Elements

The most abundant elements discovered were Silicon and Calcium, which is what one would expect from building rubble and dust. Concrete is made from 44% Calcium Oxide, 15% Silicon Dioxide (better known as sand) and smaller percentages of Aluminium Oxide, Ferric Oxide, Magnesium Oxide and Gypsum (Calcium Sulphate). Plaster is also made from Gypsum.

The major elements discovered at over 1% concentration tend to correlate with this.

The levels of some of the other elements shown in the table in percentage weight terms are, however, unusual. Sodium and Potassium are not particularly "rare" elements but the levels measured correlate strongly with some of the anomalous trace elements discovered. We will look at these in the trace element section in comparison to Zinc. Titanium and Manganese are really trace elements even though they have been included by the USGS in the table with percentage measurements, not ppm. The Titanium constituted 0.26% of the dust or 2600ppm on average and is present across nearly all locations at about the same concentration of 0.25 - 0.3%, but had an even higher peak value of 3900ppm at location WTC 01-02. This is very high and we will also discuss the possible significance of this in the next section on the trace elements.

Titanium Oxide is sometimes added as a pigment to cement and concrete if a light coloured or even white concrete is desired. For extremely white concrete, up to 5% TiO can be added. The facade of the WTC was 30% glass and 70% aluminium cladding so this would not have required white concrete for aesthetic purposes. TiO is also expensive so it will only be used where necessary.

The levels of Manganese in the dust are also very high, averaging 0.11% or 1100ppm. We are not aware of any common building material that could account for this - but interesting correlations with the other trace elements were found when the data was analysed.

Therefore we have included analysis of the Sodium, Potassium, Titanium and Manganese levels in the next section on the trace elements, since the high levels discovered in the dust were anomalous. There are some telling patterns in the Sodium and Potassium data and Titanium and Manganese should have only been found in trace quantities, not an average of 2600ppm (0.26%) and 1100ppm (0.11%) respectively.

3.5 The Trace Elements

Now we will examine the elements classified as trace elements by the USGS, listed in ppm or parts per million.

A concentration of 1% is 1 part per 100 or 10,000 parts per million (ppm). Therefore 1 part per million is 1 ten thousandth of a percent.

Let us examine the Top 10 trace elements, as they were classified by the USGS, with the missing values (not measured) removed:

TABLE 4 TOP 10 TRACE ELEMENTS

| | Dust Samples (ppm) | | | | | | | | | |
|----------------|--------------------|------|------|------|------|------|------|------|------|------|
| Outdoor Dust | Ba | Sr | Zn | Pb | Cu | Ce | Y | Cr | Ni | La |
| WTC 01-02 | 765 | 1000 | 2990 | 710 | 438 | 108 | 58.9 | 224 | 88.4 | 51 |
| WTC 01-03 | 376 | 409 | 1200 | 176 | 142 | 50.9 | 30.2 | 98 | 30.8 | 25.8 |
| WTC 01-14 | 461 | 643 | 1570 | 276 | 242 | 68.8 | 46.5 | 116 | 28.6 | 34.8 |
| WTC 01-15 | 405 | 736 | 1110 | 152 | 367 | 64.9 | 46.1 | 129 | 32.9 | 32.7 |
| WTC 01-16 | 3670 | 3130 | 1410 | 208 | 307 | 132 | 31.4 | 95.2 | 31.4 | 69.9 |
| WTC 01-21 | 460 | 787 | 1500 | 278 | 153 | 77 | 54.5 | 104 | 31.2 | 38.6 |
| WTC 01-22 | 452 | 710 | 1380 | 452 | 130 | 72 | 47.6 | 111 | 30.6 | 35.4 |
| WTC 01-25 | 624 | 695 | 1910 | 756 | 251 | 85 | 61.6 | 134 | 39.2 | 43.5 |
| WTC 01-27 | 470 | 701 | 1650 | 204 | 188 | 77.7 | 54.9 | 126 | 39.4 | 39.5 |
| WTC 01-28 | 491 | 711 | 1720 | 234 | 218 | 75 | 53.8 | 106 | 26.1 | 38.4 |
| Indoor Dust | Ba | Sr | Zn | Pb | Cu | Ce | Y | Cr | Ni | La |
| WTC 01-20 | 390 | 706 | 1330 | 153 | 176 | 61.6 | 44.1 | 94 | 29.8 | 31.3 |
| WTC 01-36 | 438 | 823 | 1400 | 159 | 95 | 70.2 | 52.6 | 107 | 28.5 | 35.6 |
| Girder Coating | Ba | Sr | Zn | Pb | Cu | Ce | Y | Cr | Ni | La |
| WTC 01-08 | 317 | 444 | 57.4 | 9.13 | 10.3 | 202 | 134 | 153 | 202 | 102 |
| WTC 01-09 | 472 | 378 | 101 | 11.7 | 12.8 | 356 | 243 | 86.5 | 22.6 | 175 |

Overall Impression

It does not take much detective work to see that something very strange has taken place.

The figures for Barium, Strontium and Zinc leap off the page.

The highest concentrations of trace elements discovered across the sampling locations were by far for Zinc, Strontium and Barium followed by Lead, Copper and Chromium.

Immediately, we see very high concentrations of Zinc and Strontium at location WTC 01-02 and even higher concentrations of Barium and Strontium at WTC 01-16 exceeding 3000ppm. The Zinc concentration exceeds 1000ppm for all the dust samples.

These concentrations far exceed what is normally considered to be a "trace" amount. For instance, there is between 1g/kg and 3g/kg of Zinc present in the dust. There is frequently more than 0.7g/kg of Strontium in the dust, with over 3g/kg at one location. These quantities are unprecedented.

A "trace" amount would normally be considered to be less than 10ppm but that does not necessarily mean that even 10ppm of some substances would be acceptable or normal.

We now examine this in more detail.

Barium and Strontium

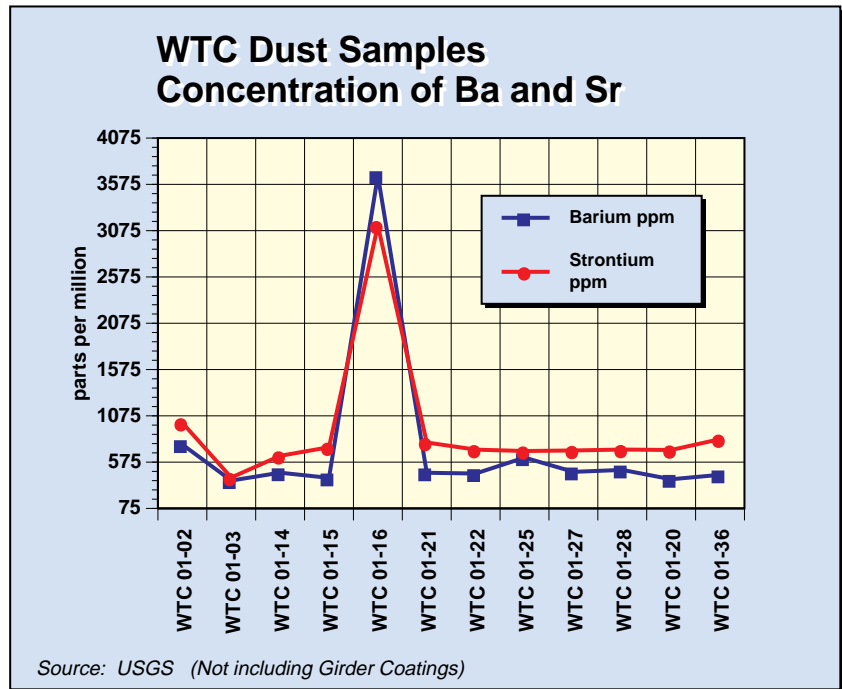
Looking at the first two columns of data, we see that the concentration of Barium and Strontium hardly falls below 400ppm for Barium or below 700ppm for Strontium, and reaches well over 3000ppm for both of them at WTC 01-16.

Barium and Strontium are rare trace elements with limited industrial uses. Strontium salts are mainly used to produce the red colour in fireworks. Barium is used in some paints, for the manufacture of some glass and as a "getter" in vacuum tubes. Both elements are highly toxic.

These elements simply should not be present in building rubble or building materials in even a valid trace amount, which would be less than 10ppm or 10mg/kg.

Below we have graphed the concentration of Barium and Strontium in the dust at the Outdoor and Indoor Sampling locations.

FIGURE 5



The enormous peak in Strontium and Barium concentration at WTC 01-16 is readily apparent. The concentration of the two elements reaches 3670ppm and 3130ppm respectively or over 0.3% by weight of the dust. This means that 0.37% of the sample was Barium and 0.31% of the sample was Strontium by weight at that location.

This is higher than even the Titanium concentration at WTC 01-16 of 0.25%.

This is quite simply astronomical. Barium and Strontium compounds are not valid constituents of concrete or any other building material such as glass, aluminium, plaster and steel. They should not be there. Even at the other sampling locations the Barium and Strontium concentration does not fall below 400ppm, which is still an astronomically high level to detect for these elements.

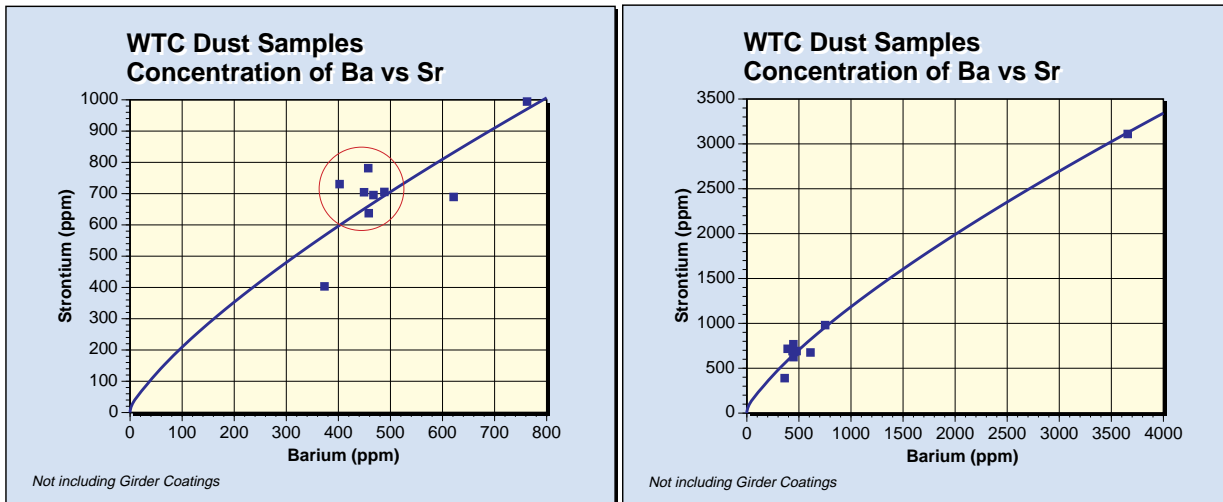
The mean concentration of Barium including the low girder coating readings is 533ppm and for Strontium, 727ppm.

These are not trace amounts. They are highly dangerous and toxic amounts.

Correlation Between Ba and Sr

In Figure 6 below, the concentration of Barium at each location is plotted against the Strontium concentration.

FIGURE 6



The correlation between the concentrations of the two elements Barium and Strontium is very strong. The graph on the left shows just the first 9 locations, where the concentration of both Barium and Strontium was below 1000ppm. The graph on the right adds the 10th data point at WTC 01-16, where the concentration of Barium and Strontium both shot up to over 3000 ppm.

By inspection we can see that the data lies on an asymptotic curve. Looking at the left hand graph in particular, most of the points form a very tight cluster (circled in red), where the Barium concentration was between 400-500ppm and the Strontium concentration was between 700 - 800ppm. This is extremely telling that such a high number of samples had very similar concentrations. It shows a fairly homogeneous dispersal of the radionuclides by the blast (with the exception of one data point at WTC 01-16) and that the Barium and Strontium concentrations are related in a fairly distinct and narrow band - they were produced by a common process. The high concentration at WTC 01-16 still fits the correlation relationship - evidently the process which had produced the Strontium and Barium was still ongoing and active at that location, leading to an extremely high concentration there.

Correlation Coefficient

The quality of this correlation can be quantified statistically using what is known as the Product Moment Correlation Coefficient. Correlation Coefficients are used to estimate how strong is the relationship between two different things - e.g. between smoking and lung disease. If there is a high correlation coefficient - the two things might be linked.

Using this method, the Coefficient of Correlation between the concentration of Barium and Strontium at the outdoor and indoor

sampling locations is 0.99 to 2 decimal places (0.9897 to 4 decimal places).

- The Correlation Coefficient between the Concentration of Barium and Strontium is 0.9897

The maximum Correlation Coefficient that it is mathematically possible to obtain is 1. This would mean that there is a perfect "match" between the two factors we are looking at and the data points for the two elements would lie on a completely straight line with no variation between them.

To obtain a Correlation Coefficient of 0.9897 with this number of measurements, taken at different places around Manhattan, is **very, very significant indeed**.

What this means is, we can say there is a 99% correlation in the variation in the concentration between the two elements. They vary in lockstep. We can say with absolute mathematical certainty that any change in the concentration of one of these elements, either the Barium or the Strontium, is matched by the same change in the concentration of the other.

Whatever **process** gave rise to the presence of the Barium or the Strontium, must have produced the other one as well.

There is only one process that can account for this: a very well known process indeed that we discussed at the beginning of this chapter.

Nuclear Fission.

We can use another statistical procedure to test whether this correlation between the two values could have arisen by chance. For instance, if there are only two data points, one could not fail to obtain very good correlation between them (correlation of 1 in fact).

This is because if you only have two data points, you can only draw a straight line to join them together.

Therefore if there are only a small number of data points, maybe half a dozen or so and a high correlation is observed, it may be due to chance rather than any real underlying connection, if we do not know or cannot provide a logical explanation for what is causing the link.

The USGS took 12 measurements for Barium and Strontium (not including the two Girder Coatings which we have excluded for the moment since they are of a different qualitative type).

Using what is called a *t* test statistic, another statistical technique, we obtain a *t* value of 21.83 for the correlation coefficient of 0.99 with 12 data points. Without explaining this in detail, what this tells us is that the chance that such a high correlation coefficient could have arisen by chance with 12 measurements is vanishingly small.

In addition we are not working in the dark, without scientific knowledge of any process that could both: a) cause Barium and Strontium to be present in the first place and b) cause such a strong relationship between the concentration of Barium and Strontium in the different samples.

We do know what process would cause this. We know that if that process had occurred, Barium and Strontium would be present. And we know that if that process had occurred, a strong statistical correlation between the quantities of Barium and Strontium would be found.

That process is Nuclear Fission.

Girder Coatings

About 400ppm of Barium and Strontium was measured in two samples of insulation girder coatings (WTC 01-08 and 01-09). The concentration of Strontium¹, [Sr], actually falls somewhat below that of Barium in the second girder WTC 01-09, as at WTC 01-16, whereas in every other sample the level of Strontium discovered was higher than Barium. Given the elevated levels of Barium daughter products found in the second girder and even the highest level of Uranium discovered, this probably shows that active fission was still ongoing in the second girder coating, in the same way as at WTC 01-16 and therefore more Barium was found than Strontium; in other samples where the rate of fission had slowed down to give way to decay, the concentrations of Barium and Strontium reverse, due to the different half lives. Barium isotopes have a shorter half life than Strontium isotopes so they decay more quickly and after a period of time when no new Barium or Strontium has been deposited, [Sr] will exceed [Ba]. The fact that more Barium than Strontium was still found at WTC 01-16 and WTC 01-09, shows that the overall nuclear processes taking place were somewhat favouring Barium over Strontium - and hence Zinc as well, as we will explore later.

Summary

The tight cluster of Barium (400 - 500ppm) and Strontium (700 - 800ppm) concentrations across widely separated sampling locations in Manhattan is cast iron proof that Nuclear Fission has occurred. We know that Barium and Strontium are the characteristic signature of fission: they are formed by two of the most common Uranium fission pathways. The fact that their concentrations are so tightly coupled means that their source was at the very epicentre of the event which created the dust cloud that enveloped Manhattan. It was not a localised pre-existing chemical source which would have only contaminated a few closely spaced samples and left the rest untouched.

The very high concentrations of Barium and Strontium at location WTC 01-16 show that active nuclear fission was still ongoing at that spot: the dust was still "hot" and new Barium and Strontium was being actively generated by transmutation from their parent nuclei.

1. [Sr] denotes the *concentration* of Strontium

Zinc

We will now examine the quantities of Zinc that were detected in the WTC dust samples.

Looking at the column of data for Zinc in Table 4, the concentration of 2990ppm at WTC 01-02 immediately stands out. In fact, for the outdoor samples, Zinc is the most common trace element at *all* sampling locations, with generally between 1000ppm and 2000ppm except for this spike of nearly 3000ppm at WTC 01-02.

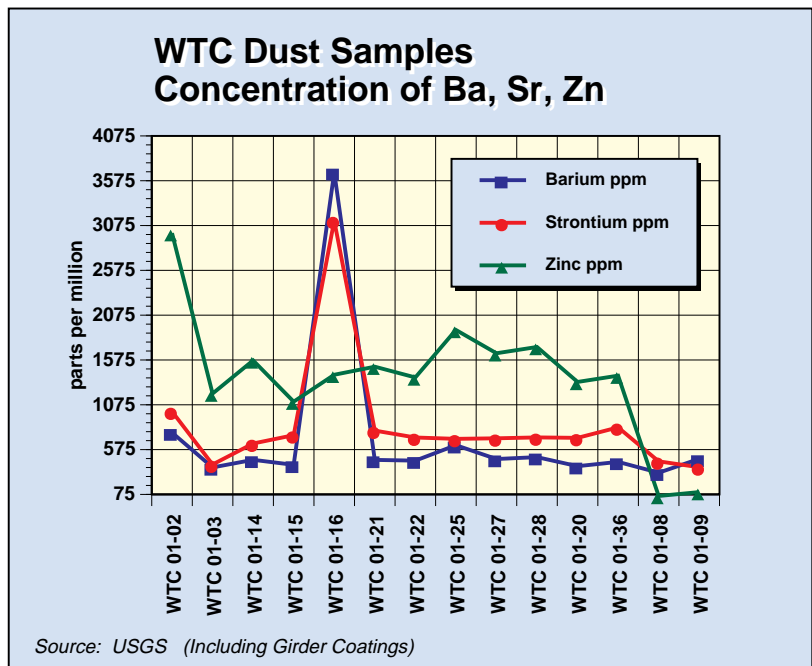
This translates to what is an enormous concentration of 0.1% to 0.2% of Zinc in the dust overall and at WTC 01-02, 0.299% of the dust was Zinc. This exceeds the concentration of the supposed "non-trace" element Manganese and Phosphorous and almost equals the elevated Titanium concentration of 0.39% at that location.

Where did all this Zinc come from?

Comparison of Zinc to Barium and Strontium

In the following graph, we additionally plot the Zinc concentration at each location in comparison with the Barium and Strontium.

FIGURE 7



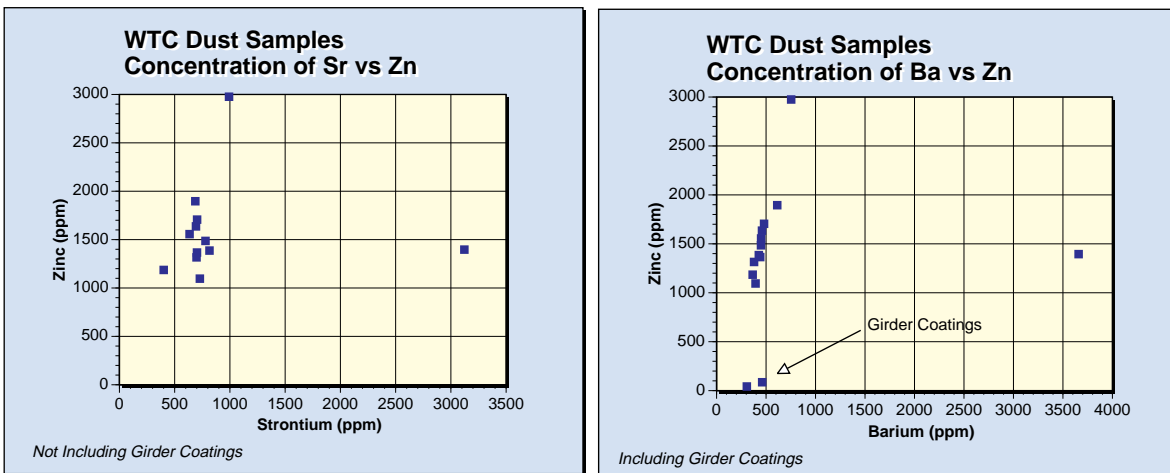
One can see that the peak in Zinc concentration at WTC 01-02 is also accompanied by a higher Ba and Sr concentration for those elements than at any of the other locations except WTC 01-16, but the concentrations of Zn, Sr and Ba all vary together in a similar way at all locations, except at WTC 01-16 and in the girder coatings, which are the last two data points WTC 01-08 and WTC 01-09.

If we include the data for WTC 01-16, the Correlation Coefficient between the Zinc and Barium concentration is 0.007 to 3 decimal places, from which we would conclude there is absolutely no correlation at all.

If we exclude that one sampling location, where the Ba and Sr concentrations peaked, the correlation coefficient between the Zinc and Barium is 0.96 to 2 decimal places and between the Zinc and Strontium, 0.66 to 2 decimal places.

This can be seen on the following graphs, where we plot the concentration of Barium and Strontium at each location against the Zinc concentration.

FIGURE 8



This shows that the Zinc and Barium concentrations are closely related and if we exclude what must have been an extraordinary event at WTC 01-16 as an outlier, the correlation is very good. The Product Moment Correlation Coefficient is 0.96. (We will discuss later why WTC 01-16 might be so qualitatively different to the other locations).

By inspection we can see that the equation of the line of best fit is approximately:

$$[Zn] = 3 \cdot [Ba].$$

i.e. the concentration of Zinc is 3 times the concentration of Barium. Calculated by the method of least squares, the equation for the best fit regression line is: $[Zn] = 4.4[Ba] - 538$.

The correlation between the Zinc and Strontium is not so clear, showing that the relationship must be more indirect. We would expect this, since Strontium and Barium are produced by different nuclear fission pathways.

In addition, in spent nuclear fuel rods, Strontium is found as Strontium oxide (SrO) - the Strontium produced by the nuclear fission explosion under the Twin Towers will certainly have been oxidised to SrO by the heat. (The Barium and Zinc will also have been present as BaO and ZnO). SrO is extremely soluble in water, so some of the Strontium concentration results obtained may have been distorted by the rain which fell on New York a few days after the towers were destroyed.

Figure 8 shows that there is a very strong linear relationship between the levels of Zinc and Barium found at the WTC site. This may indicate that a closely related nuclear sub-process gave rise to them, which produced 3 times as much Zinc as Barium by weight.

If so, that would be a very unusual nuclear event.

There is a lesser known nuclear process that could perhaps account for this, which would be indicative of very high energies indeed. This process is known as Ternary Fission.

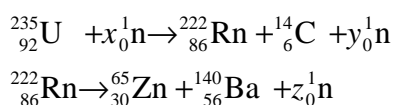
Ternary Fission

In Ternary Fission, an atom of uranium splits not into two atoms but into three atoms. One of the well known by-products of atomic bombs is Carbon 14 and it is known that Carbon 14 is also a ternary fission product of nuclear reactors. The power loading in a reactor has to be high to produce ternary fission, in other words we need a lot of energy to split uranium into three pieces instead of two. Nuclear explosions would certainly produce ternary fission - maybe even quaternary fission and even further levels of "atom smashing".

What would be the other two nuclei or fission fragments produced if one of the three is Carbon 14?

The following process would account for this:

(EQ 6)



In the first step, Uranium fissions into Radon, the heaviest of the inert or noble gases plus Carbon 14 plus a large burst of excess neutrons. We have seen that Uranium "likes" to use the noble gas pathways, so the production of Radon and therefore the complementary fission fragment Carbon 14 must occur, accounting for the Carbon 14 produced by nuclear bombs.

In the second step, the Radon further fissions into Barium and Zinc with a further large release of neutrons.

This process would certainly partially account for the high levels of Zinc detected, in close correlation to Barium. Other interrelated processes must also have been at work to produce almost exactly three times the

concentration of Zinc to Barium. This might lead into classified domains of nuclear weapons engineering and testing but one conclusion can be drawn: the high levels of Zinc indicate that the WTC nuclear explosions might have had characteristics *akin to a neutron bomb*.

Girder Coatings

It is also very interesting that the concentration of Zinc in the indoor and outdoor dust samples is over 1000 ppm but an order of magnitude lower than that in the girder coating samples, where only 50 - 100ppm of Zinc was found. Whatever caused the elevated levels of Zinc in the dust, did not penetrate into the girder insulation coatings.

The Barium and particularly Strontium levels in the girder coatings are also lower than in the dust but still fairly high, comparable to their levels in the dust. So this discrepancy between Barium and Zinc in the girder coatings, along with WTC01-16, suggests that there was not just one direct process at work for the generation of Zn and Ba but a number of parallel processes - as one would expect from the different fission pathways that occur.

Very interestingly, the levels of further fission daughter nuclei of Barium and Strontium such as Cerium, Yttrium and Lanthanum are all an order of magnitude higher in the girder coatings than in the dust.

So we have an inverse relationship between the levels of Zinc, Barium and Strontium and the levels of further decay nuclei in the girder coatings.

This may indicate that fission products (Ba, Sr) were initially forced into the girder coatings by the proximate force of the blast. These fission products had partially decayed into Ce, La and Y by the time the samples were collected but no new Ba or Sr had been deposited in the meantime. The girder coatings therefore trapped high levels of Ce, La and Y but some of the oxides of these elements in the dust exposed to the weather was leached out by the rain. However, in the dust itself, spread out across Manhattan, more Ba/Sr/Zn was still being deposited from the decay of the heavy radioactive inert gases present and from new fission products being continually generated under the site.

Sodium and Potassium

Now we will look at Sodium and Potassium. These are not rare elements as such and the USGS classified them as "Major Elements" due to the high levels found. However, the variations in concentration of these two elements at the different sampling locations is very revealing and we have compared them to Zinc in the following analysis.

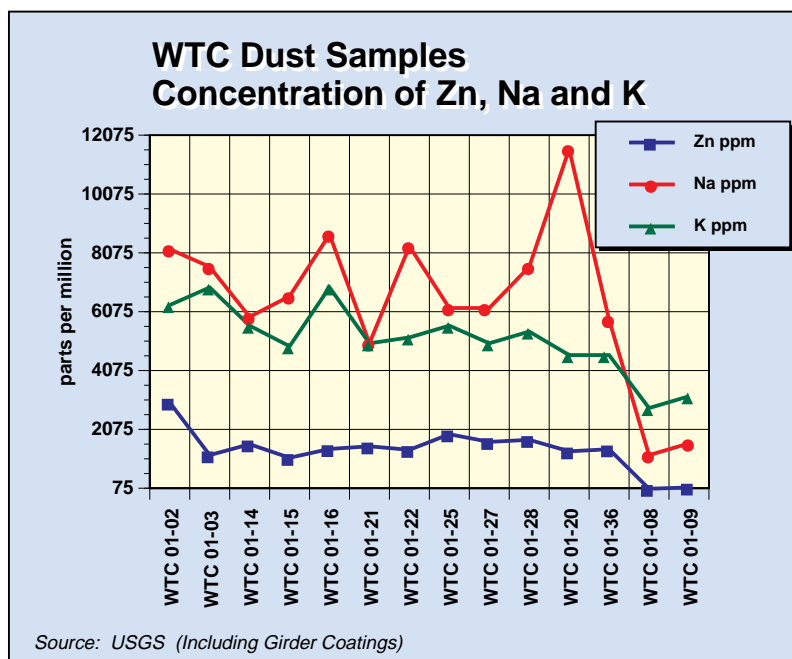
In the following graph, we show the concentration of Potassium, Sodium and Zinc at each sampling location.

This shows that (apart from the very high peak in Sodium levels for one of the indoor dust samples) the Sodium and Potassium concentrations both display this now characteristic peak at location WTC 01-16.

Sodium has the same peak as Zinc at WTC 01-02 and like Zinc, falls to a minimum in the girder coatings - far below the concentrations found in the dust.

Potassium is very similar except its concentration was not a peak at WTC 01-02 but somewhat lower than the next location, WTC 01-03.

FIGURE 9



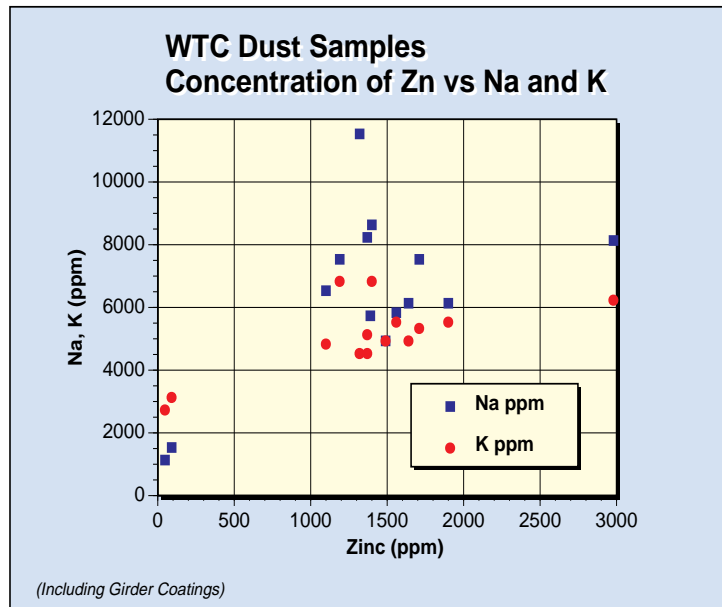
There are clear correlations and relationships here which show that the Potassium and Sodium concentrations did not arise at random. If they are products of radioactive decay, where did they come from?

Remember that Strontium is produced by a fission pathway that proceeds through the Noble Gas Krypton and then the Alkali Metal Rubidium. Similarly, Barium is produced through Xenon and the Alkali Metal Caesium. We know that Uranium fission favours these pathways through the Noble Gases - we will see later proof that Neon was produced along with the balancing Lead - we would also expect Argon.

Just as radioactive isotopes of Krypton and Xenon decay by beta particle emission to produce Rubidium and Caesium, radioactive isotopes of Neon and Argon also decay by beta emission to produce Sodium and Potassium. We would indeed expect to find anomalous levels of these elements present - what was found is again consistent with the occurrence of nuclear fission.

If we plot [Zn] against [Na] and [K] in rank order, we obtain the following:

FIGURE 10



There is a very strong correlation between [Zn] and [K].

Between [Zn] and [Na] there almost appear to be two relationships. On the one hand, as the concentration of Zinc increases, we see a linear increase in the level of Sodium, but on the other as the level of Zinc approaches 1500ppm, the concentration of Sodium takes another route to shoot up past 8000ppm to over 11,000ppm in one of the indoor dust samples. Is there a way of accounting for this?

Yes there is. Potassium has 5 radioactive isotopes, which all decay in a similar timescale, i.e. very quickly in a matter of hours or minutes. 4 of them decay by beta emission and only one by positron emission - which means the majority of the Potassium will transmute into Calcium which in turn will change into Scandium and Titanium. This is generally going towards Zinc and we will see later the strong correlation between Titanium and Zinc. (We could have equally used Titanium here in comparison to Sodium and Potassium, but we wanted to show the clear relationship with an element classified by the USGS as a trace element, since Titanium was classified as a "Major Element" by the USGS).

However, Sodium has only two radioactive isotopes; one decays by beta emission with a long 15 year half life to form Magnesium, Aluminium etc. while the other decays by positron emission (back to Neon) with a 2.6 year half life. This means that as the concentration of this Sodium isotope increases, it will anti-correlate with heavier elements such as Titanium, Zinc etc. - it is decaying back towards Neon and lighter elements while the other Sodium isotope, decaying much more slowly and therefore having relatively less impact on the production of its heavier element daughter products, will correlate with the occurrence of heavier elements.

This is exactly what we see in Figure 10 - there appear to be two Sodiums, one that correlates with Zinc (heavier elements) and one that goes towards inverse proportionality - [Zn] actually decreases as [Na] increases. This fits the behaviour we would expect from the two Sodium isotopes.

Other Trace Elements

We now examine the other Top 10 Trace Elements, many of which are well known decay products of the nuclear fission pathways. Their presence in such high quantities in the WTC dust cannot be explained by any other mechanism.

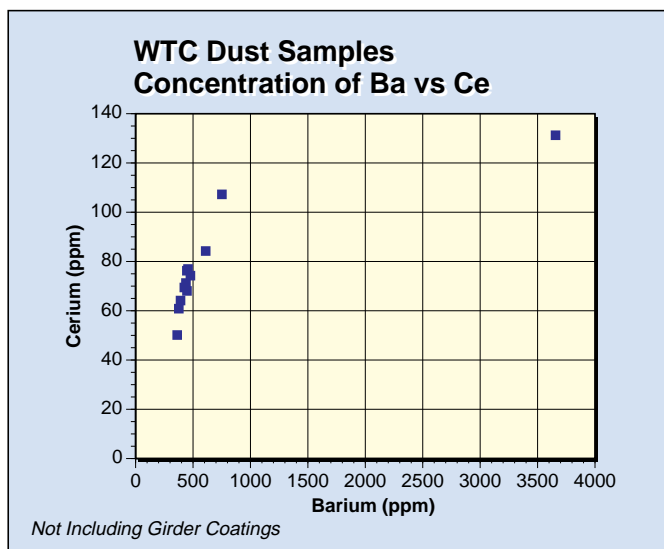
Cerium

In looking at Table 4 of the trace elements, we see peaks in the concentration of Cerium at WTC 01-02 and 01-16, i.e. at the same two locations as the Barium/Strontium peaks.

Cerium is a very rare element - yet over 100ppm was discovered at WTC 01-02 and 01-16, which is again an extraordinarily high level for that element. Cerium is the second daughter product of Barium in that disintegration pathway, coming after Lanthanum

Figure 11 shows the concentration of Barium plotted against Cerium.

FIGURE 11



- The Coefficient of Correlation between Barium and Cerium is 0.84.

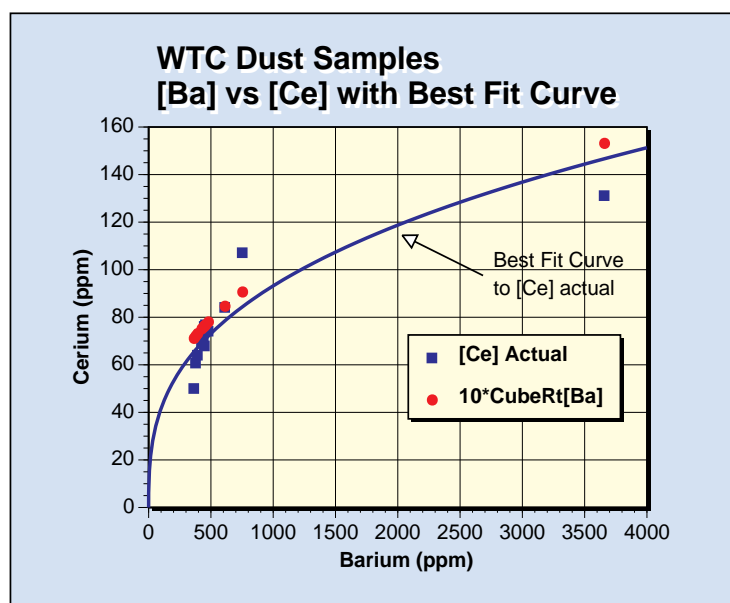
The data points in fact fit a cubic relationship, in which the concentration of Cerium is approximately equal to 10 times the cube root of the Barium concentration.

(EQ 7)

$$[Ce] = 10 \cdot \sqrt[3]{[Ba]}$$

We show the data again below with the actual Barium concentration now also plotted against the Cerium value calculated by the above model equation and a best fit curve to the actual data. The correlation between the actual Cerium values and the values predicted by this model is clearly of the same order.

FIGURE 12



What does this tell us? Since Cerium is the second daughter product of decay of Barium, we would expect the amount of Cerium present to increase linearly with the concentration of Barium. The first part of the curve, for [Ba] less than 1000ppm is more or less linear as expected. Why then does the relative concentration of Cerium fall at WTC-16 where [Ba] was so high, at 3670ppm? This shows that at that location, new Barium was still being actively produced, with intense nuclear fission and decay of intermediate products still ongoing. There was not yet enough time for the Barium being produced to decay into its daughter products. The concentration of Uranium at this location was not the highest found though, which supports what we conjectured before: the Barium and Zinc was not just produced by direct fission of Uranium but by Ternary fission and other intermediate decay steps from the other elements that were produced. Another factor that has to be taken into consideration is the presence of different isotopes of the fission products (Barium, Strontium) - we will discuss this later.

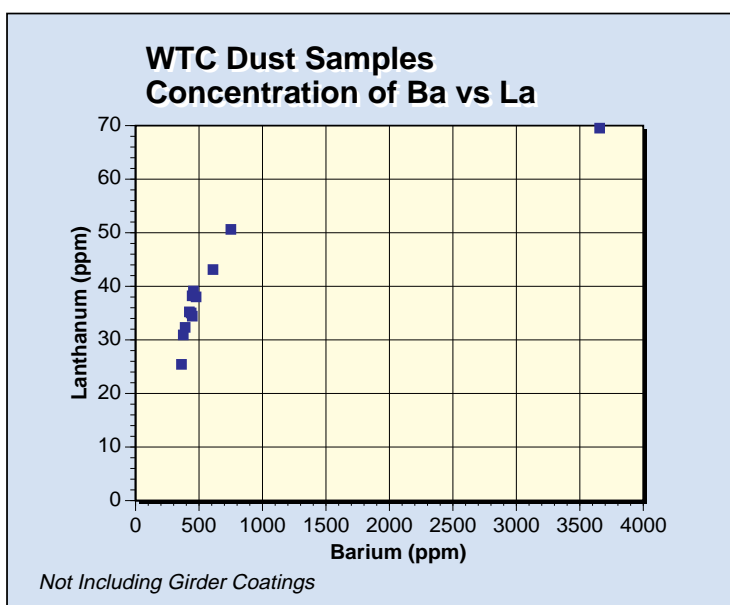
Since Cerium is the second daughter product of Barium, this high correlation between the Barium and Cerium concentrations in the expected exponential relationship is further evidence that Nuclear Fission has taken place.

Lanthanum

Lanthanum is the next element in the disintegration pathway of Barium, situated between Barium and Cerium.

The concentration of Barium versus Lanthanum is plotted below.

FIGURE 13



The graph is almost identical in form to the relationship between Barium and Cerium. A similar inverse exponential (cubic) relationship is clearly visible. In this case, [La] is approximately equal to 5 times the cube root of [Ba].

Lanthanum has a much shorter half life than Cerium: most of its isotopes have a half life of only a few hours whereas β^- decay by Cerium is measured in half life periods of a month to 10 months. Cerium's β^+ decay going back to Lanthanum occurs more quickly but Lanthanum's β^+ decay going back to Barium occurs in a similar timescale to that - a few hours - so we are left with the net effect of Lanthanum's β^- decay being much quicker than that of Cerium, so the concentration of Cerium remaining was higher than that of Lanthanum.

Cerium versus Lanthanum

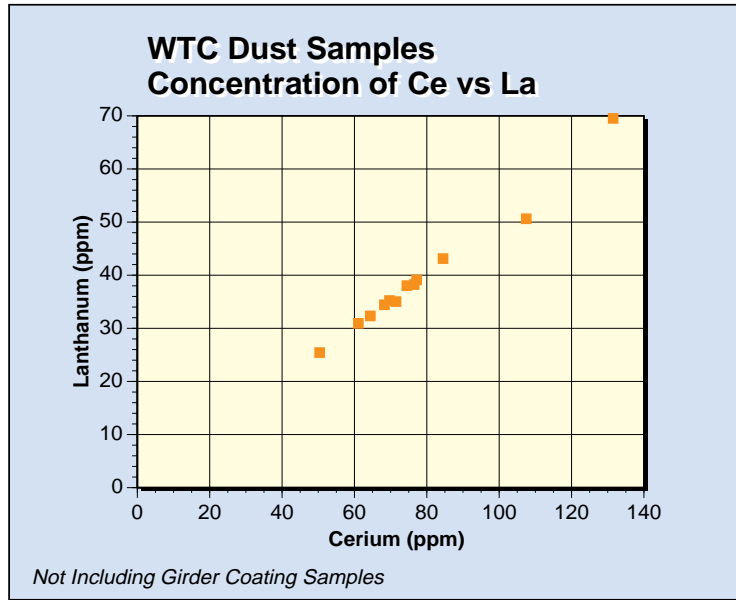
Next we show the relationship between Lanthanum and Cerium. We have an almost perfect linear correlation between the two. This graph (Figure 14) confirms our two cubic models, which predict that the concentration of Lanthanum produced should be half the concentration of Cerium.

Therefore $[Ce] = 2 \times [La]$.

Given that Cerium follows Lanthanum in the fission pathway, that both elements are extremely rare except in nuclear events and the

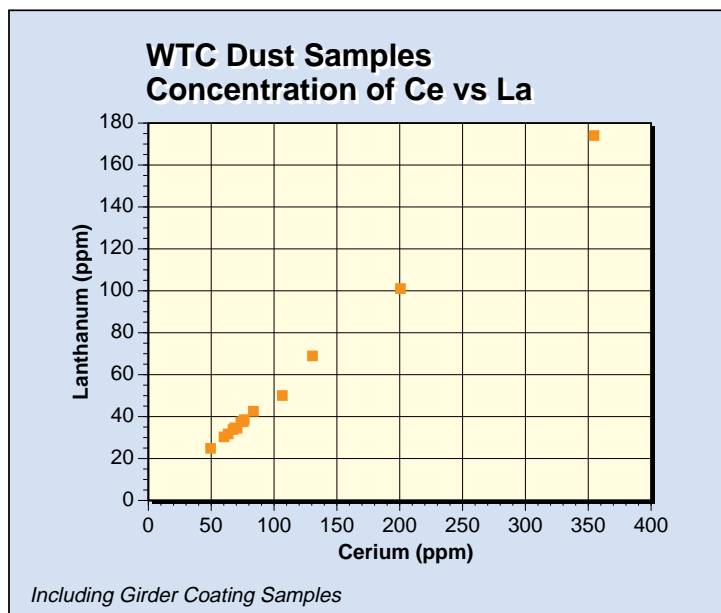
concentration of Lanthanum is almost perfectly correlated with the concentration of Cerium, the occurrence of Nuclear Fission of Uranium is the only possible explanation.

FIGURE 14



We show this data again below, including additionally the two very high Girder Coating values.

FIGURE 15

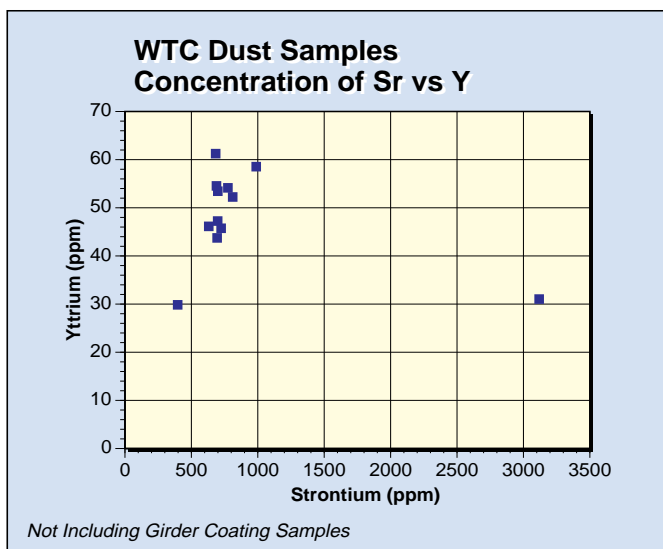


These relationships in the data provide further overwhelming proof that Nuclear Fission of Uranium has taken place, with characteristic statistical relationships between the quantities of the different elements present that are indicative of the fission pathways of Uranium.

Yttrium

Yttrium is also a very rare element and should not be present in dust from a collapsed office building. Yttrium is the next decay element after Strontium. If we plot the concentration of Strontium against Yttrium, we obtain Figure 16.

FIGURE 16



Strontium 90 has a much longer half life (28.78 years) than most Barium isotopes so we would not expect to see as high a concentration of Strontium's daughter products as those that are produced from Barium. This is in fact what we see - the concentration of Cerium (next daughter product to Barium) is higher than Yttrium, the next daughter product to Strontium.

Another factor is that different isotopes of these daughter elements are produced with different half lives and, as before, they decay by different mechanisms - electron (beta particle) emission and electron capture (EC). The USGS of course have not analysed which isotopes and what proportions of those isotopes were present for each element - Barium, Strontium, Zinc, Cerium etc.

Although Sr 90 is the main Strontium isotope produced which decays by β^- emission, some Sr 82, 83 and 85 is produced as well which decay by EC into Rubidium. Different Yttrium isotopes also decay by β^- emission and EC both into Zirconium and back into Strontium.

Examining Figure 16, we see what may look like two separate and distinct relationships between Yttrium and Strontium. One set of points seems to indicate a linear increasing relationship between the Strontium

and Yttrium concentration, while another set shows [Sr] reaching a maximum and decreasing again as [Y] increases (ignoring the outlier with >3000ppm [Sr]). We have seen this pattern with Sodium and we will see it again: the relationship where [Sr] decreases as [Y] increases can be explained by the influence of Yttrium isotopes decaying by electron emission into elements of higher atomic number - i.e. Zirconium while the other line is formed by those Yttrium isotopes that decay by EC back into Strontium - boosting the amount of Strontium present.

Also, if there was a significant time difference between the analysis of the samples, it would affect the comparison of results because Yttrium 90 has a half life of only 2.67 days while Y91 has a half life of 58.5 days.

We know that some samples were collected on the evening of the 17th September and some 24 hours later on the 18th September, which may have had an effect on Y90 levels in the two sets of dust samples by removing them from the influence of the nuclear processes continuing in the environment. A time delay in the analyses of the samples would also have a significant effect. 24 hours is 3/8ths of the half life period, so some 23% of the Y90 present in the dust will decay away¹ in this time. Any Strontium 89 present would not be greatly affected by a delay of 1 day since its half life is 52 days, so the corresponding [Sr] made up of [Sr90] + [Sr89] would not show a noticeable difference; [Y] made up of [Y89] + [Y90] would show a noticeable difference.

This may explain why in Figure 16 in the central cluster some of the Yttrium concentrations were lower than others for a similar Strontium concentration - maybe there was a significant delay between the times the analyses were performed.

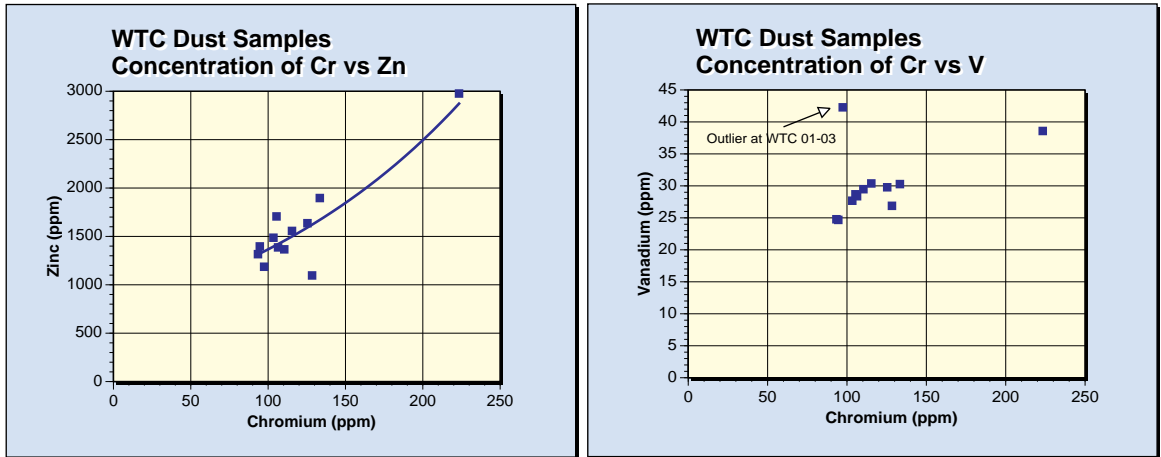
Overall, we can see that there is a marked correlation between [Sr] and [Y], with one outlier - WTC 01-16 where the concentration of Strontium (and Barium) peaked. This was as we have said evidently a location where energetic nuclear processes were still ongoing. New Strontium was being actively produced and therefore the concentration of Yttrium was relatively lower.

1. From $N/N_0 = e^{-\lambda t}$

Chromium

The presence of Chromium is also a tell tale signature of a nuclear explosion. Its concentration is shown plotted against Zinc and Vanadium below.

FIGURE 17 CHROMIUM vs ZINC AND VANADIUM CONCENTRATION

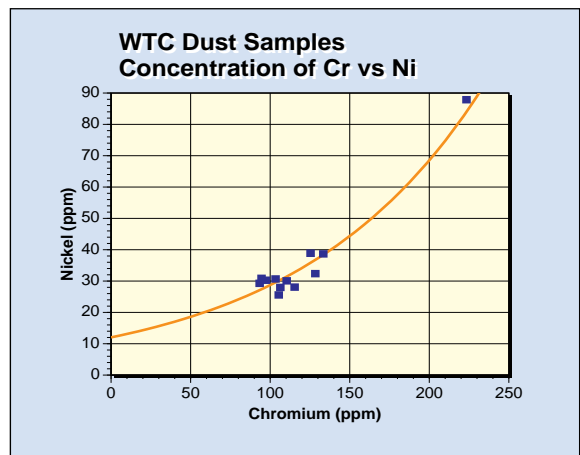


There is a strong correlation between the Zinc and Chromium concentration. The Coefficient of Correlation is 0.89.

There is also an indication of a strong correlation between Chromium and Vanadium with 6 points lying on an almost perfect exponential curve, with one outlier (WTC 01-03) of 42.5ppm where the Vanadium concentration reached its highest level.

Figure 18 below plots [Cr] against [Ni]. There is a strong cluster in the two concentrations showing a very homogenous distribution in these elements.

FIGURE 18 CHROMIUM vs NICKEL

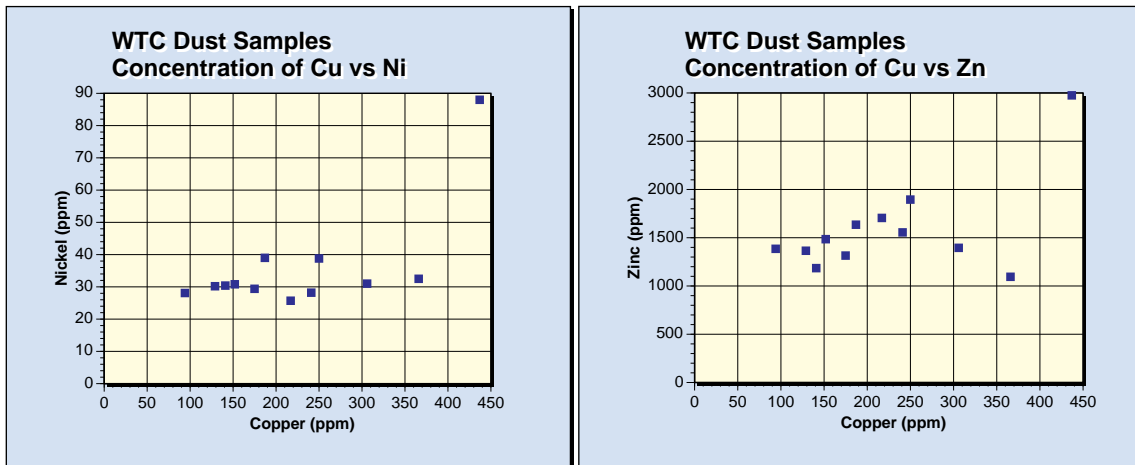


Copper

This element is also indicative. If we plot the concentration of Copper against Zinc and Nickel, we obtain the graphs in Figure 19.

The concentration of Nickel was almost the same everywhere, except for the peak in [Ni] of 88ppm matched by the [Cu] peak of 450ppm.

FIGURE 19



The Copper - Zinc relationship is very interesting, showing in fact two distinct relationships again depending on isotopic composition. There are two radioactive isotopes of Copper (Cu64 and Cu67) with short half lives of 12.7 hours and 2.58 days respectively which decay into Zinc isotopes. Two other isotopes ⁶⁰Cu and ⁶¹Cu decay the other way by positron (β^+) emission into Nickel - and in fact ⁶⁴Cu goes both ways, into both Nickel and Zinc. This would explain why there strongly appear to be two Cu-Zn relationships.

The decay of radioactive Copper by beta particle (β^-) emission into Zinc would have been another source of the Zinc found in the WTC dust.

Titanium and Manganese

Titanium and Manganese are not present in trace quantities but in quite high concentrations and as we have discussed earlier, even if Titanium had been included as a pigment (TiO) in some of the concrete when it was made this would be far from sufficient to account for the high levels of Titanium found in the dust. However, it is interesting that there is a peak in Titanium concentration of 3900ppm at location WTC 01-02, where the Zinc reached its maximum of 2990ppm and many other elements also peaked. Manganese also peaks with 1500ppm at WTC01-02 and WTC 01-25, which correlates with the two Zinc peaks of 2990ppm and 1900ppm.

FIGURE 20

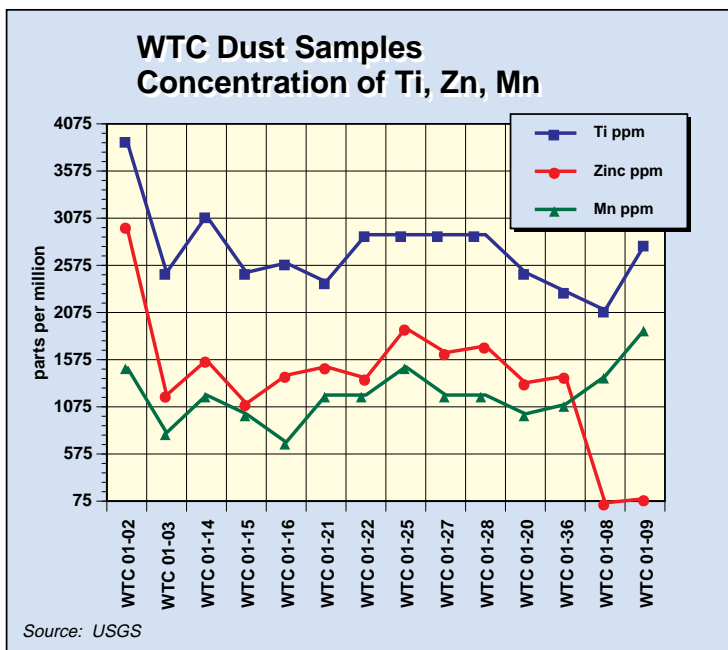


Figure 20 shows that once again, the high levels of Titanium and Manganese detected were not naturally occurring: the correlations with each other are too marked.

The main pathway we would expect for the production of Titanium would be by beta decay of Argon, through Potassium, Calcium and Scandium.

Another possible mechanism for the production of the Titanium would be by ternary fission of plutonium. Ordinary thermal nuclear reactors always produce plutonium when the non-fissile U238 in the fuel (which is the majority of the Uranium in the reactor) absorbs neutrons: this produces Uranium 239 which then undergoes beta decay into Plutonium, with atomic number 94.

Plutonium would then undergo ternary fission into Xenon, Argon and Titanium.

Another possibility is that the reactors under the Twin Towers were Fast reactors or Fast Fission Breeder Reactors. In this type of nuclear reactor, the fuel is made of a central plutonium core surrounded by Uranium 238. As the central plutonium core is fissioned to produce energy, the U238 jacket also captures neutrons and is converted into yet more Plutonium: the reactor "breeds" more fuel than it uses.

One "advantage" of this reactor type is that since the plutonium can only be fissioned by fast neutrons, no moderator is required to slow them down to produce slow neutrons, as required in an ordinary reactor. This means the size of the fast breeder reactor is much smaller. This may well have been a significant "advantage" for use in a clandestine underground installation under the Twin Towers of the WTC.

Uranium could also undergo ternary fission into Xenon, Argon and Calcium - with the Calcium then undergoing β^- decay (which is its primary mode) into Titanium: in fact it would also form from normal binary fission of Uranium into Argon and Tungsten, with the Argon then decaying into Potassium, Calcium, Scandium and Titanium as we said before.

If we look at the Periodic Table of Elements, starting with Titanium at atomic number 22, we have the sequence Ti V Cr Mn Fe Co Ni Cu Zn.

FIGURE 21

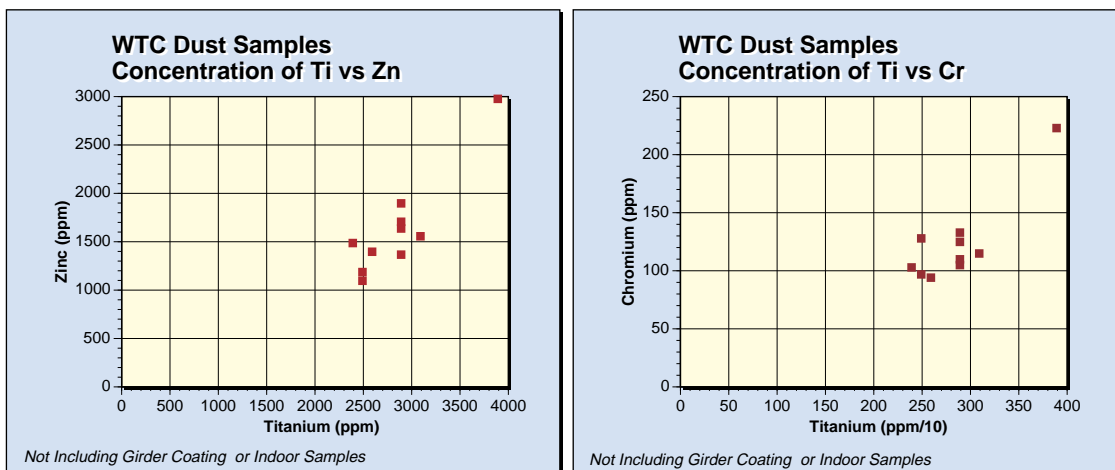
EXTRACT FROM PERIODIC TABLE

| | | | | | | | | |
|----|----|----|----|----|----|----|----|----|
| 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| Ti | V | Cr | Mn | Fe | Co | Ni | Cu | Zn |

The transmutation of Titanium into the succeeding elements would occur by emission of beta particles, as shown in Figure 2 for Bromine and Xenon. We see many of the elements found in anomalous quantities in this part of the Periodic Table, where the radioactive isotopes of these "transition elements" as they are called interact in complex decay patterns.

The concentration of Titanium versus Zinc and Chromium is shown below in Figure 22.

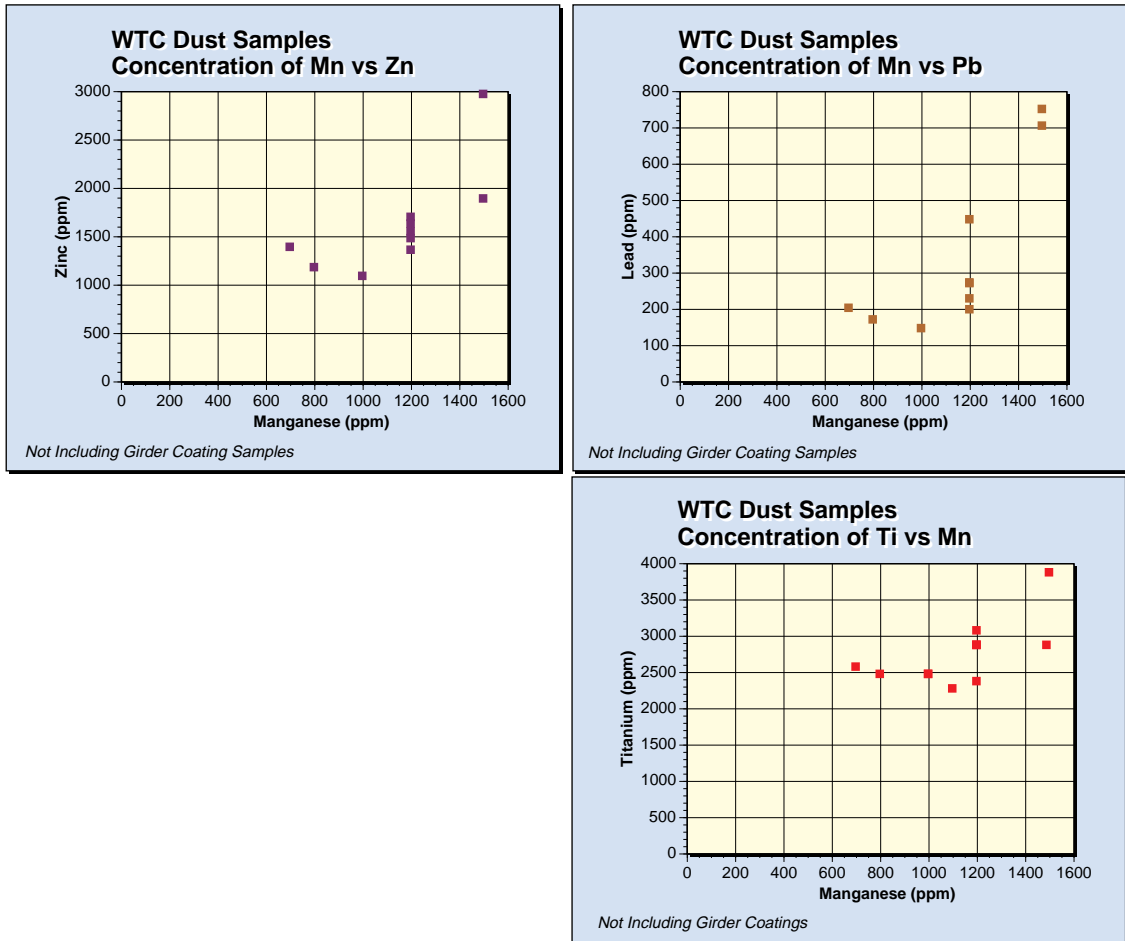
FIGURE 22



Again, there is a distinct correlation, with the concentration of all three metals peaking at location WTC 01-02, which as we have seen was a peak for many of the metals found, even common ones such as iron and aluminium.

The concentration of Manganese plotted against Zinc, Lead and Titanium is shown in the following graphs.

FIGURE 23



In all three cases we see an absolutely identical pattern. First, a decrease in [Zn], [Pb] and [Ti] as [Mn] increases, then at 1200ppm of Manganese (0.12%) there is an extraordinary increase in the quantity of Zinc, Lead and Titanium present in the dust. Finally, an asymptotic levelling off for even higher levels of [Mn].

It is therefore very indicative indeed that we have these complex correlations and relationships between these different metals. Data of this type has probably never before seen the light of day, revealing the complex fission events and processes that take place in an energetic nuclear explosion. We can surmise that in the confined space of the nuclear blast, indeed not only ternary but quaternary and further levels of fission have taken place, with daughter nuclei not just decaying by ordinary alpha, beta or gamma radiation emission but literally being fissioned again by the intense neutron radiation, to create a complete smorgasbord of the Periodic Table.

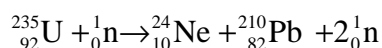
Lead

Lead is yet another product of nuclear fission. We would not expect to find lead piping in a building of 1970s vintage, certainly not in quantities sufficient to produce the high concentrations of Lead that were detected.

One of the frequent pathways for nuclear fission of Uranium is to a Noble Gas and the balancing element, which together add up to the 92 protons in Uranium. This is what occurs with Barium and Strontium, where the balancing Noble Gas is Krypton and Xenon. Lead has an atomic number of 82. The balancing element with an atomic number of 10 is Neon - a noble gas. Radioactive Lead is a well known product from nuclear fission and we would not be surprised to find it in the fallout.

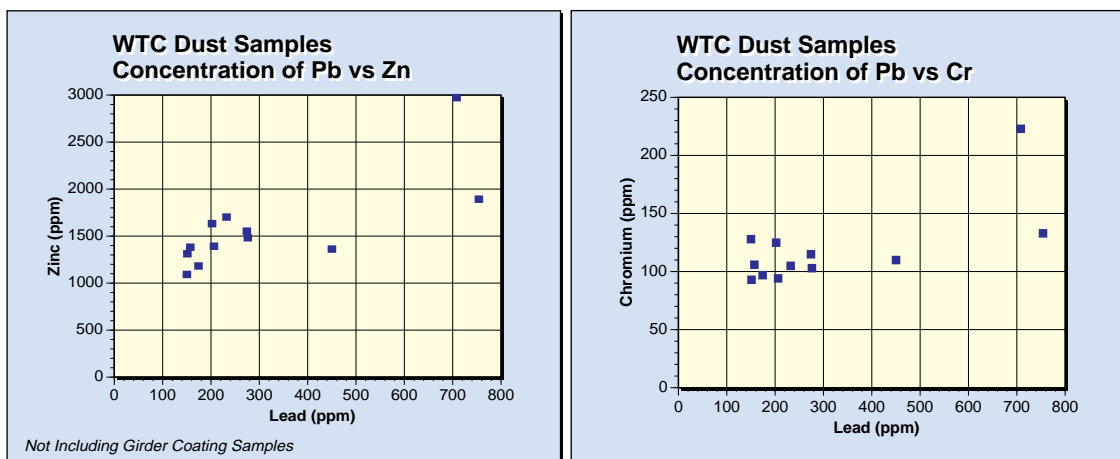
The nuclear equation for fission of Uranium to Lead follows a preferred Noble Gas pathway:

(EQ 8)



There were two spikes measured in the concentration of Lead of over 700ppm, at WTC01-02 and WTC 01-25; these two locations also had the two highest concentrations of Zinc (2990ppm and 1910ppm), Chromium (224ppm and 134ppm) and Manganese (1500ppm and 1500ppm).

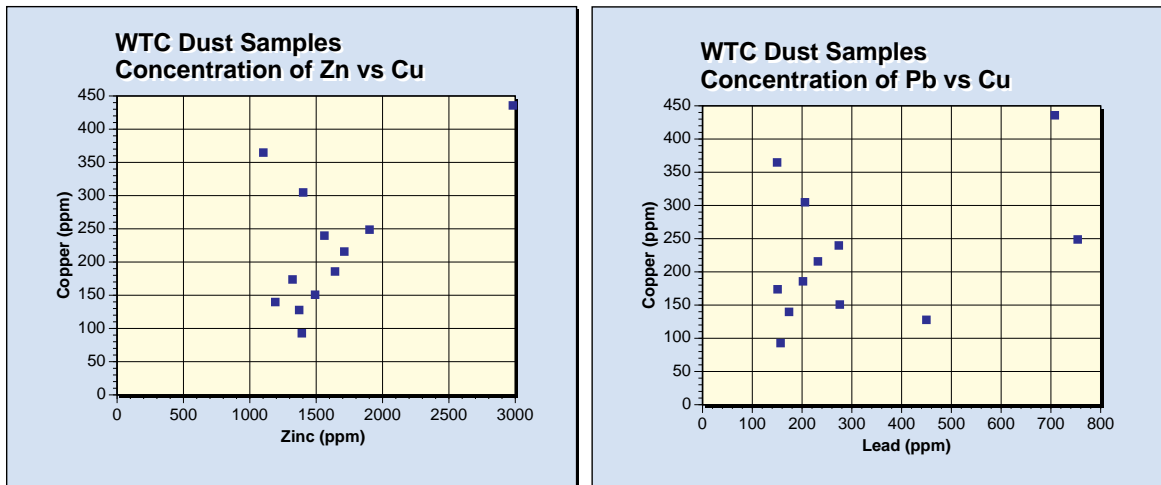
FIGURE 24



By inspection, we can see that there is a power relationship between the concentration of Lead and Zinc and perhaps a linear relationship between [Pb] and [Cr]. Referring back to Figure 23, we know that there must be a close relationship between [Pb] and [Zn] because they both have an identical relationship to [Mn].

In Figure 25 we have plotted Lead against Copper and shown Copper against Zinc again for comparison (already shown in Figure 19 on page 42).

FIGURE 25

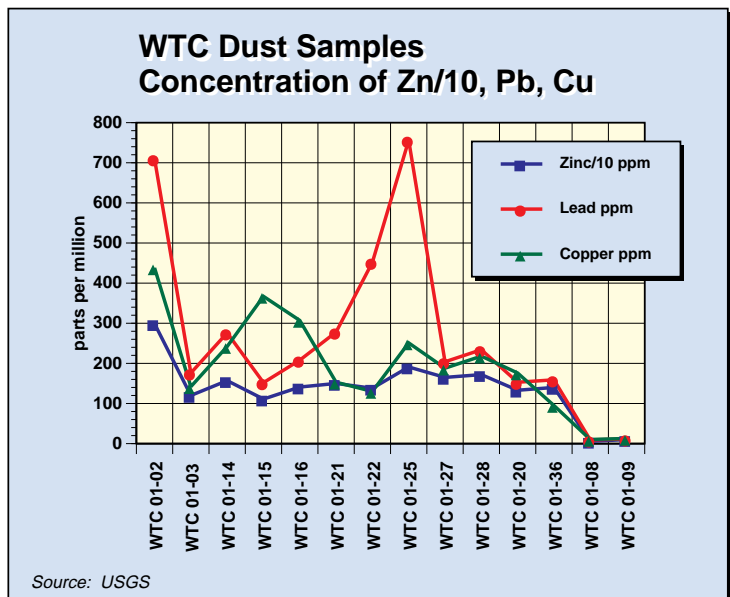


We can see clearly that Zinc and Lead both have exactly the same relationship to Copper.

These correlations show that the presence of the Lead is also indicative that a nuclear explosion occurred.

We earlier commented that Copper transmutes into Zinc by beta decay. If we plot the concentration of Zinc, Lead and Copper together by location, the correlations can be seen in a different way. Particularly interesting is the dramatic fall in concentration of all these elements in the girder coatings.

FIGURE 26



In Figure 26, [Zn] has been divided by a factor of 10, to avoid losing all the detail in the scaling if the y axis instead went up to 3000ppm. The variation in [Pb] is matched by the variation in [Zn] almost perfectly across all sampling locations, including the Indoor and Girder Coating samples.

The concentration of Copper, [Cu], follows that of [Zn] with one distinct exception at WTC 01-15. As we have already seen in Figure 19, there seem to be two Cu - Zn relationships. If some of the Zinc was being formed by beta decay of Copper, then the high [Cu] at WTC 01-15 could reduce [Zn], since the formation of Zinc by that decay pathway would be retarded by material being held up at the Copper stage, before decaying on to Zinc. Therefore this graph along with the lower curve in Figure 19 (right hand graph) does tend to confirm that some of the Zinc was indeed being formed by beta decay of Copper.

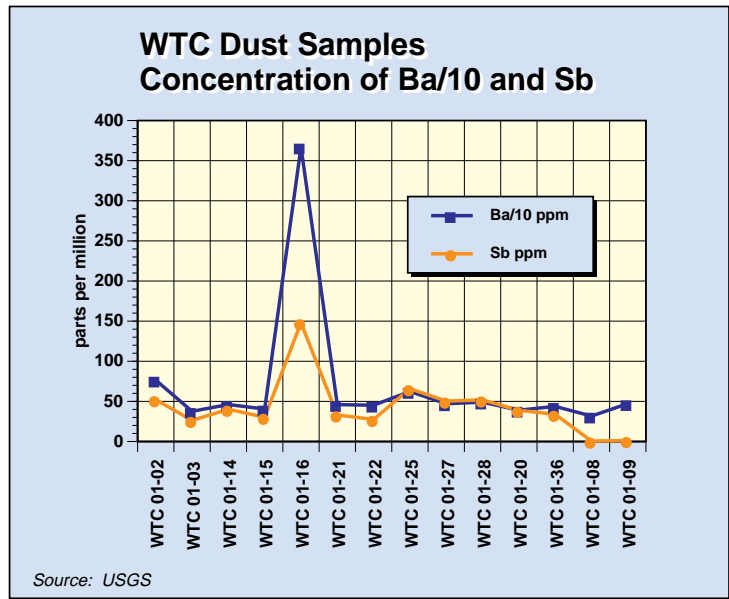
This would at least be a small mercy, since the Zinc isotopes formed from Copper are stable - i.e. they are not radioactive.

Antimony

Antimony is a rare toxic metal used in engineering in small quantities for hardening other metals (e.g. in bearings). The variation in concentration of Antimony, [Sb] found in the dust very closely mirrors the level of Barium but then falls to practically nothing in the girder coatings.

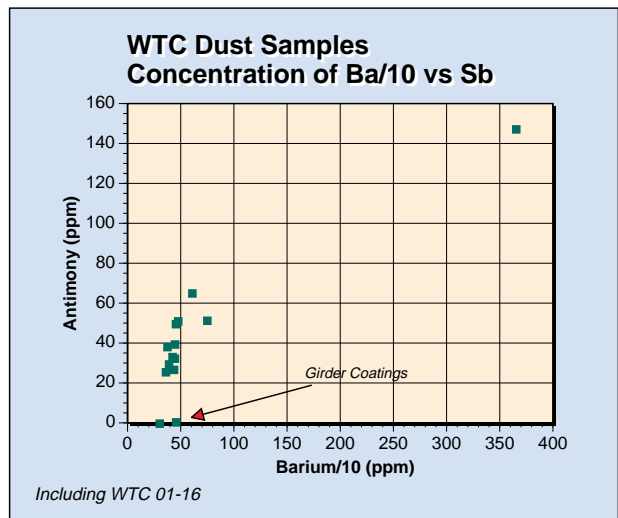
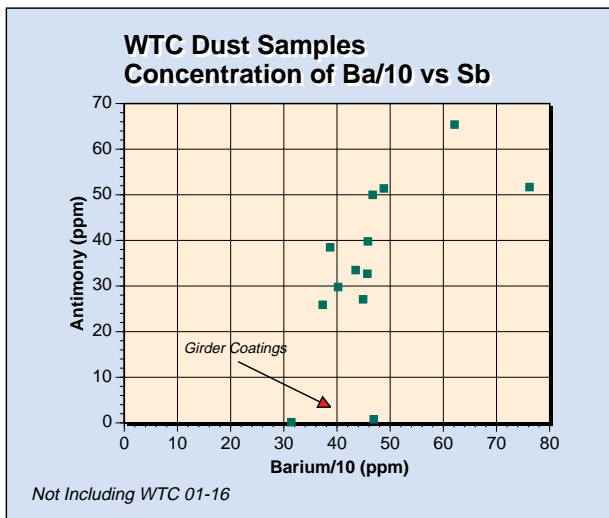
Figure 27 shows the level of Antimony measured at each location against the Barium concentration divided by 10.

FIGURE 27



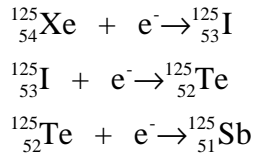
Arranged in rank order, the data is presented as follows, both including and not including the massive spike in concentration at WTC 01-16.

FIGURE 28



Antimony has an atomic number of 51 and atomic weights ranging from 119 to 127. Barium has an atomic number of 56 with atomic weights ranging from 128 to 140. Some radioactive Xenon isotopes could transmute into Antimony via Iodine and Tellurium by electron capture, whereas as we know, Barium is formed from Xenon by electron (beta particle) emission - so we would expect a common source, isotopes of Xenon, for both the Barium and Antimony.

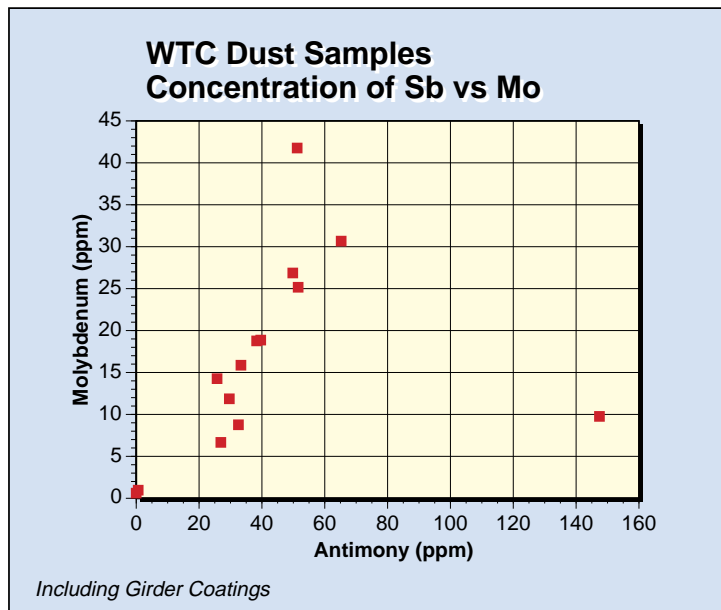
(EQ 9)



The evident close correlation between Barium and Antimony in the above graphs is therefore very logical and can be explained by the nuclear chemistry of Equation 9.

There is also a very intriguing relationship between Antimony and Molybdenum.

FIGURE 29



This is clearly not a random distribution - there is in fact an almost perfect linear relationship between [Sb] and [Mo], with the usual exception of one sample where the Antimony concentration was exceedingly high at 148ppm: WTC 01-16 again.

The atomic number of Antimony is 51; the atomic number of Molybdenum is 42. Together this makes 93 while Uranium has an atomic number of 92. Tin and Molybdenum are well known fission products. It seems very likely that some of the Uranium indeed fissioned

into Tin (with atomic number 50) and Molybdenum (42) and the Tin then decayed by beta emission into Antimony.

Again, Figure 29 is a very telling graph indeed.

The Girder Coatings

In the earlier graph (Figure 26 on page 47), [Zn], [Pb] and [Cu] are all much lower in the Girder Coatings than in the dust, both indoor and outdoor. Referring to Table 2, we can see that a number of other elements also had their lowest levels in the girder coatings: Antimony, Molybdenum, Cadmium.

On the other hand, we saw earlier that the concentration of Cerium, Yttrium and Lanthanum are all an order of magnitude higher in the girder insulation coatings than in the dust. In fact, in the second girder at WTC 01-09, [Ce], [Y] and [La] at 356ppm, 243ppm and 175ppm are 6 times as high as the lowest levels recorded for these elements in the dust, far exceeding "trace" levels. Some other elements also recorded their highest levels in the girder coatings: Nickel in particular with 202ppm at WTC 01-08, about 10 times as high as all the other measurements for Nickel - but then [Ni] falls back again in the second girder coating, WTC 01-09.

This is illustrated below in Figure 30 and Figure 31. The last two data points on the x axis at WTC 01-08 and WTC 01-09 are the two girder coatings.

FIGURE 30

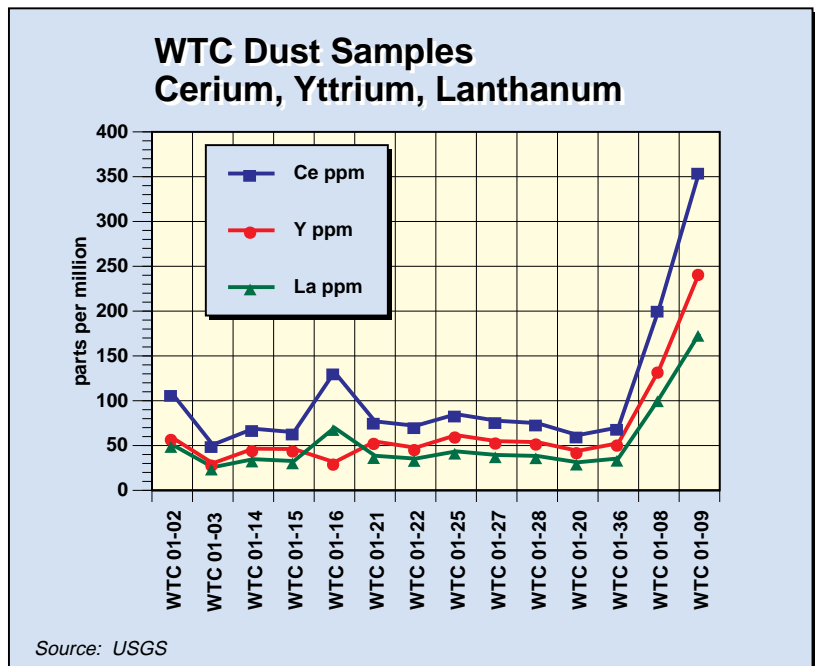
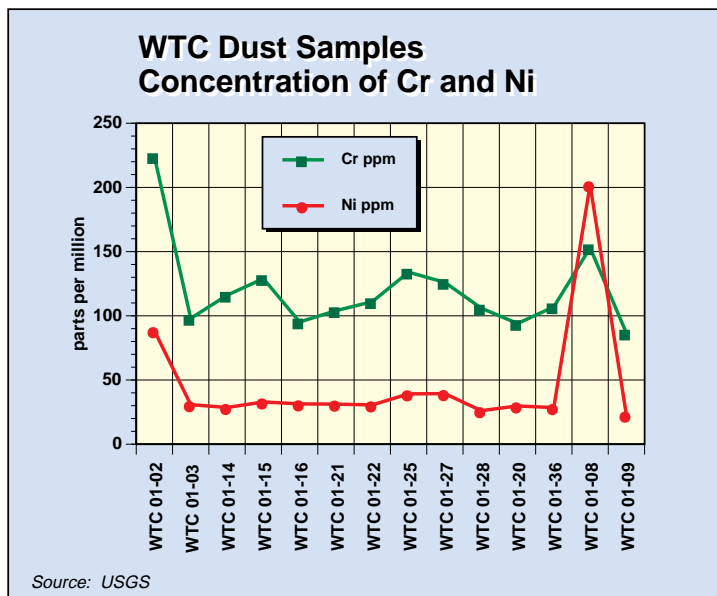


FIGURE 31



Judging from the USGS map (Figure 36 on page 59), location WTC 01-09 was the closest sampling location to the towers. It is situated about 20 metres to the west of the North Tower (WTC 1).

As we have already hypothesised, the nuclear blast may have impregnated the girder coatings with the initial fission products Barium and Strontium. These would then have partially decayed away so that by the time of the analysis, high concentrations of their rare daughter products (Ce, Y, La) were trapped in the coating.

Looking back at Figure 7 on page 29, we see that there are two places where [Zn] is lower than [Sr] and [Ba]: at location WTC 01-16 and in the girder coatings. The high levels of Cerium, Lanthanum and Yttrium found in the girder coatings are also consistent with the still fairly high Strontium and Barium levels in the girders: so why should the level of Zinc be lower in the girders and at WTC 01-16, given that otherwise Zinc is so closely linked to Barium?

The answer may be that Bromine, a fission fragment produced as you will remember by the initial fission of Uranium, decays by β^- emission into Strontium by only 3 decay steps - and we know that Strontium is tightly coupled to Barium, since Barium is produced from the other fission fragment Xenon (see Figure 2 on page 7) - while Zinc is produced from the Bromine fragment the other way by β^+ emission in 5 steps. Therefore depending on the isotopic mixture produced and the half lives of all the intermediary products, when very active decay is still ongoing in a sample which recently still had a high Uranium concentration, we are seeing a lot of Barium and Strontium being produced while Zinc has not yet formed: but later on (or in samples which are not as "hot") as the Barium and Strontium decay away,

whatever pathways led to Zinc now predominate and create a high level of Zinc in the dust.

In fact, the analysis should be done the other way around: there is very little if any data publicly available on what mixture of fallout, fission products, isotopes and stable end products is produced when an atomic bomb explodes or in this case when a nuclear reactor explodes in these conditions. The data is showing us what did happen. It will be used to calibrate and refine predictive models.

Another intriguing fact is that the concentration of Nickel and Chromium peaked in the first girder coating (WTC 01-08), particularly the Nickel, but fell again in the second girder coating. This could be explained by hypothesising that the first girder was contaminated with stainless steel, which contains both nickel and chromium but the second girder was not.

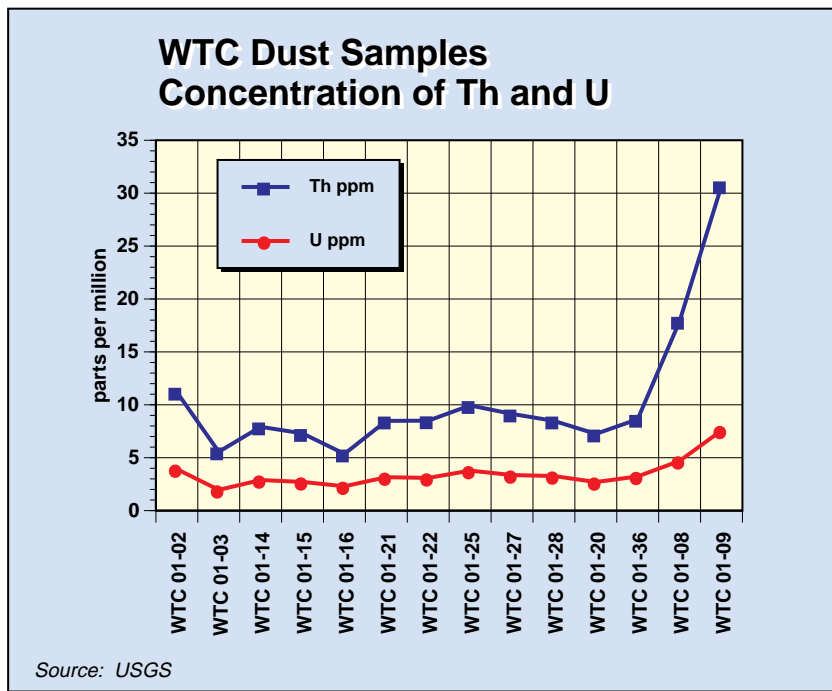
Whatever the physical mechanisms might be which account for these findings, the underlying mathematical correlations are self evident and lead ineluctably to the deduction that a nuclear explosion must have occurred to account for the presence of these elements.

Uranium and Thorium

Finally we come to the detection of measurable quantities of Thorium and Uranium in the dust from the WTC, elements which only exist in radioactive form.

The graph below plots the concentration of Thorium and Uranium detected at each sampling location. Again the last two locations WTC01-08 and 01-09 are for the two girder coating samples.

FIGURE 32



The Uranium concentration follows the same pattern as Thorium, although the graph scale does not show this markedly. [U] follows the dip in [Th] at WTC 01-03 and 01-16 but the highest concentration of Uranium also matches Thorium in the second girder coating, WTC 01-09 at 7.57ppm.

7.57ppm of Uranium greatly exceeds normal trace element levels.

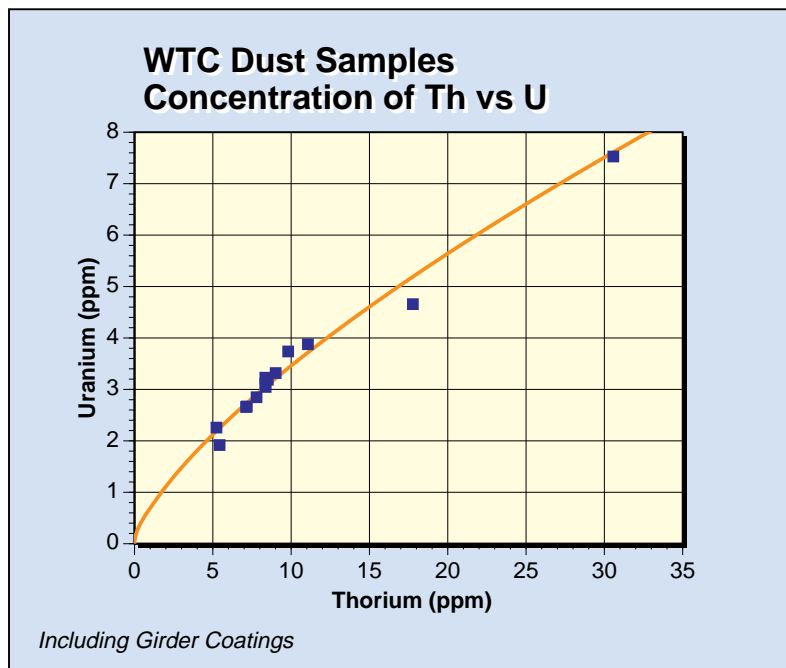
The second girder contained 30.7ppm of Thorium, 6 times as high as the lowest level of that element detected.

Thorium is a radioactive element formed from Uranium by α decay. It is very rare and should not be present in building rubble at all.

The Thorium picture also mirrors that found for Yttrium (see Figure 30). The concentration of both elements dips at WTC 01-03 and 01-16 (where so many other elements peaked) but in the two girder coatings (WTC01-08, 01-09) is nearly an order of magnitude higher than in the dust samples.

[Th] is plotted against [U] below.

FIGURE 33

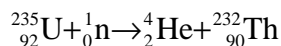


The high correlation between [Th] and [U] is self evident.

The presence of these two elements in such high concentrations (particularly in the two girder coatings at WTC 01-08 and 01-09) in such a close mathematical relationship is further incontrovertible evidence that a nuclear event has taken place.

As we said earlier, Thorium is formed from Uranium by α decay. An α particle is the same as a Helium nucleus, so this means we have one of the favoured fission pathways: Uranium fissioning into a Noble Gas and the balancing element, in this case Helium and Thorium:

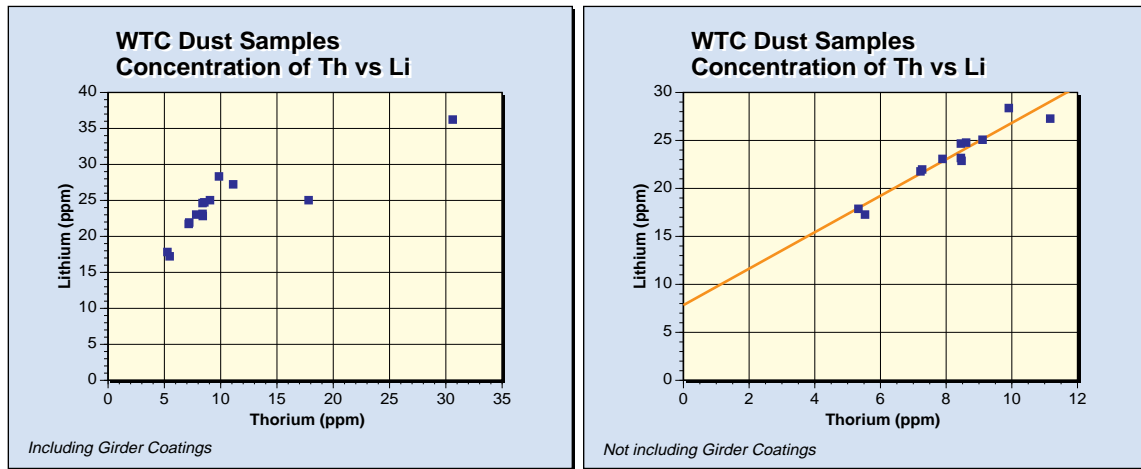
(EQ 10)



If the Helium formed follows the same pattern as Krypton and Xenon (which decay by beta emission through Strontium and Barium), then we would expect to find Lithium and Beryllium, the next elements after Helium in the Periodic Table, in quantities that correlate with Thorium.

The USGS did measure the Lithium concentration in the dust: [Th] is plotted against [Li] below in Figure 34, both including and excluding the two girder coating samples.

FIGURE 34



The graph of [Th] vs [Li] including the girder coatings, has exactly the same form as Figure 33, showing [Th] vs [U] also including the girder coatings. Without the two girder coatings, the correlation of [Th] to [Li] in the dust is completely linear.

We therefore have compelling evidence that this fission pathway of Uranium to Thorium and Helium, with subsequent decay of the Helium into Lithium, has indeed taken place.

Conclusion

It is out of the question that all these correlations which are the signature of a nuclear explosion could have occurred by chance.

The presence of rare trace elements such as Cerium, Yttrium and Lanthanum is enough to raise eyebrows in themselves, let alone in quantities of 50ppm to well over 100ppm. When the quantities then vary widely from place to place but still correlate with each other according to the relationships expected from nuclear fission, it is beyond all doubt that the variations in concentration are due to that same common process of nuclear fission.

When we find Barium and Strontium present, in absolutely astronomical concentrations of over 400ppm to over 3000ppm, varying from place to place but varying in lockstep and according to known nuclear relationships - the implications are of the utmost seriousness.

The presence of Thorium and Uranium correlated to each other by a clear mathematical power relationship - and to other radionuclide daughter products - leaves nothing more to be said.

This type of data has probably never been available to the public before. It is an unprecedented insight into the action of a nuclear device. Nuclear weapon scientists around the world will have seized this data to analyse it and determine exactly what type of device produced it.

3.6 The USGS Interpretation

Although the USGS presented the raw data from their Chemical Analysis in their report, they did not present the logical conclusions that have to be drawn from it. In fact, the most telling data was “buried” where it would be missed by the casual reader. Only by looking through the actual table of data measurements themselves and analysing it as we have done will the reader discover the true implications of that data.

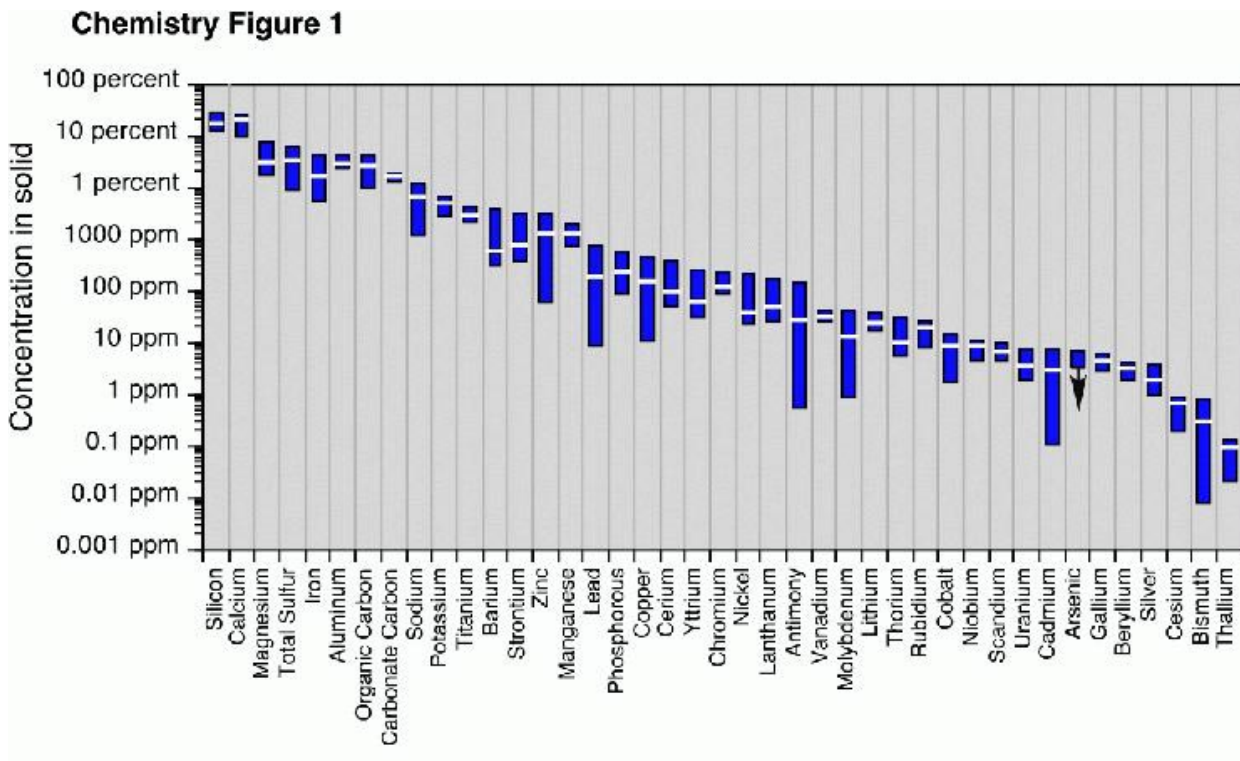
It is difficult not to draw the conclusion that the USGS did not wish to draw attention to the presence of Strontium in the dust, since Strontium is a well known “buzzword” that the general public associate with nuclear explosions.

The word “Strontium” only appears in two places in the USGS report. The first place is in “Chemistry Figure 1”, shown below in Figure 35, showing the concentration of all elements measured at the WTC site. The second place is in the table of data itself (<http://pubs.usgs.gov/of/2001/ofr-010429/chem1/WTCchemistrytable.html>).

“Chemistry Figure 1” is described by the USGS as follows:

"Plot showing the concentration ranges (colored boxes) and means (horizontal white bars) for major and trace elements in samples of WTC dusts and girder coatings. Several samples had arsenic concentrations below the analytical detection limits, indicated on the graph by the arrow extending downward from the detection limit concentration. Concentrations of some elements (such as tin) were not determined in these samples. For comparison, 1 percent equals 10,000 parts per million. "

FIGURE 35 USGS MAJOR AND TRACE ELEMENTS



The column for Strontium does not stand out among all the other elements. Strontium is the 13th column from the left.

We will not reproduce the data table here again. The reader has to look down to the 16th data entry to find Strontium (see Table 1).

In “Chemistry Figure 4”, shown below in Figure 36, the USGS present the main trace elements discovered on a map depicting each sampling location.

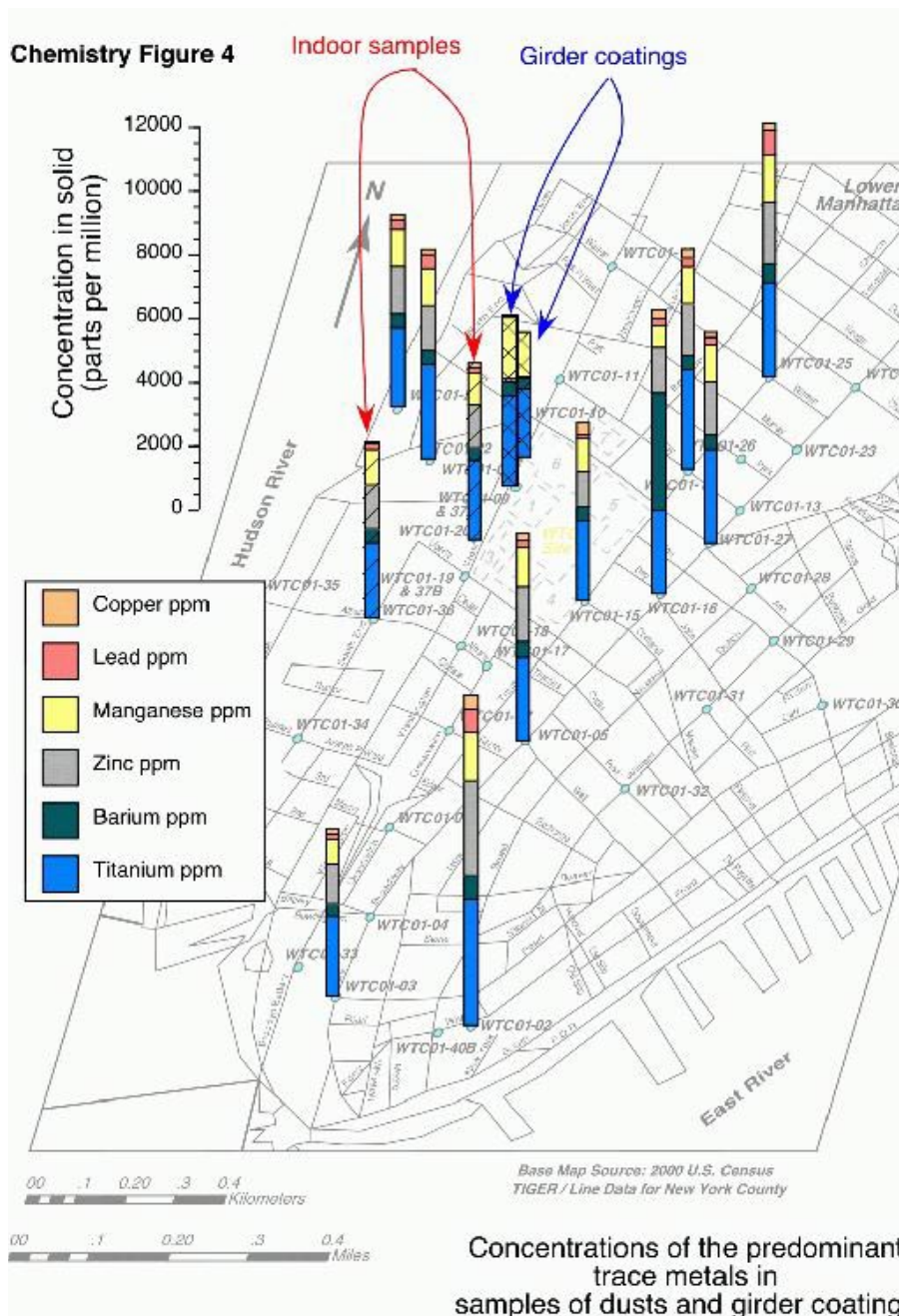
The USGS describe “Chemistry Figure 4” as follows (emphasis added):

*“Map of lower Manhattan showing (as stacked bar charts) variations in concentration (in parts per million) of some **predominant** trace elements of WTC dust and girder coating samples. Dust samples collected indoors are indicated by the single hatch pattern and girder coating samples by the cross-hatch pattern; all others are dust samples collected outdoors.”*

“Chemistry Figure 4” is supposed to be showing the **predominant** trace metals. However, even though the Strontium concentration **exceeded** that of Barium at nearly all locations, Strontium has not been shown on the graphic, while the Barium has been shown.

FIGURE 36

USGS PREDOMINANT TRACE ELEMENTS DISCOVERED



Barium is not widely known as a radioactive element, whereas it is much more common knowledge that Strontium is a product of nuclear explosions. A global programme to monitor Strontium 90 levels in the milk teeth of children was started in the 1960s to monitor the effects of fallout from the nuclear testing of the period. Most countries have now stopped testing for Sr90, but a renewed disturbing increase in Strontium 90 levels in the teeth of US children since the beginning of the 1990s has recently been made public¹.

(The implication of this is that nuclear fission products are again being released into the environment from an unacknowledged source or sources).

In their discussion of the chemical analysis results¹, the USGS make the following statement:

"With the exception of one sample that is high in barium (WTC01-16), the trace metals barium, lead, copper, and chromium are present in concentrations of hundreds of parts per million."

For any chemist the use of the word "Barium" by itself would set alarm bells ringing but the USGS omit the fact that the Strontium concentration at WTC 01-16 was almost as high as the Barium concentration, both were in fact over 3000 ppm and that at every other location the Strontium concentration in fact **exceeded** the Barium concentration.

The above remark is also disingenuous since a concentration of "hundreds of parts per million" for Barium is in any case astronomical - again, to a knowledgeable person, this sentence rings a loud alarm bell.

It is clear that the USGS intentionally omitted to mention the word "Strontium" anywhere in the text of their report or on the main graphic "Chemistry Figure 4" which presents the predominant trace metal analysis. This would have immediately drawn attention to the fact that there had been a nuclear explosion, while as stated above, less attention is likely to be drawn to the word "Barium".

The only places the word "Strontium" appears are in the body of the data table itself - where one has to look down into the trace elements to see it - and buried as column 13 in "Chemistry Figure 1". So to a quick glance through, the word "Strontium" with its strong psychological overtones is very likely to be missed.

The USGS also fail to mention on their discussion of the Trace Elements Analysis the presence of not hundreds but thousands of parts per million of Zinc. The Zinc concentration is shown on "Chemistry Figure 4" (our Figure 36 above) where it might be noted by the astute observer but it is not discussed. Nor is the anomaly of the very high Titanium concentration discussed. The location of the scale on the graph makes it difficult to read any data from this graph at all - it raises more questions than it answers.

Conclusion

One cannot criticise the USGS for not stating that the WTC had been subjected to a nuclear explosion or for not drawing attention to the Strontium in their report. They would probably have been immediately

1. "Unexplained Increase in Strontium 90 in US Children", Le Monde, P12, 18/11/03
1. <http://pubs.usgs.gov/of/2001/ofr-01-0429/chem1/>

censored or intimidated if they had tried to do so. Perhaps they were censored. In any case, any chemist reading the report can easily see the Barium highlighted and would be immediately alerted by its presence.

In fact, it is known that the EPA was heavily intimidated and interfered with to stop them responding properly to the disaster¹. It was impossible for the USGS to do any more than they did.

On the contrary, the USGS have done humanity a great service by having the courage to publish the data, in plain sight for those who know what they are looking at and know how to interpret it.

Drawing attention to the Barium but not the Strontium was a more subtle way of motivating anybody reading the report to look in more detail at the underlying data.

3.7 Discussion and Analysis

The Fallout Characteristics

It is clear from the above analysis that the source of the Barium and Strontium in the WTC dust cannot be due to a general presence in building material, since in this case the concentrations would not show enormous spikes at a few locations. The concentration would be fairly similar across all locations, as it is for the common elements. Indeed, any building with these concentrations of the highly toxic (and in this case radioactive) elements Strontium and Barium in its structure could never have been built because the construction crew would have become seriously ill first.

Equally, the presence of these greatly elevated levels of Strontium and Barium cannot be due to some unknown chemical stockpile in the building. In that case, there would be no wide dispersal, just a localised deposit of wherever the stockpile came to rest. In any case, the hypothesis of a secret chemical hoard of Barium and Strontium in a commercial office building, of the size required to produce these high concentrations, would be an outrageous breach of health and safety regulations and worthy of investigation in its own right. The correlated concentrations of Barium and Strontium enable that impossible hypothesis to be discounted.

In addition to the Barium and Strontium, so many rare radionuclides are present that are characteristic products of nuclear fission, that nothing can explain them away.

The final analysis showing the presence of Thorium and Uranium is superfluous but adds absolutely definitive corroboration.

1. "Pollution and Deception at Ground Zero", The Sierra Club, 2004

The only explanation that is possible - and indeed the scientifically inescapable conclusion - is that a large scale fission chain reaction of Uranium 235 took place in the locality, releasing Strontium, Barium and many other radionuclides into the environment as daughter products of Uranium fission.

In other words - a Nuclear Explosion.

We can see that the initial quantity of Uranium 235 present in the nuclear device underwent fission, including the two most well known pathways to the first relatively long lived daughter nuclei of Barium and Strontium. The concentrations would not be equal since the two fission pathways are not followed equally; however the concentrations would be directly proportional to each other since a certain proportion of the Uranium will follow the Strontium pathway and another proportion will follow the Barium pathway. This is what the data shows.

The presence of large quantities of other well known daughter products in correlated quantities makes the case overwhelming, beyond any shadow of a doubt whatsoever that a nuclear explosion occurred.

The complexity of the other relationships are also what we would expect from a high energy nuclear explosion rather than the low energy fission in a controlled reactor. Fission did not stop with two fission fragments - many of these were fissioned in turn into smaller atoms by the intense concentrated neutron radiation in and underneath the building.

WTC 01-16 and 01-02

These two sampling locations had the highest concentrations of radionuclides.

WTC 01-02 is at the tip of Manhattan on the East River side. WTC 01-16 is about 0.15 miles east of Tower 1, behind Building 7.

The debris map produced by the USGS shows that most of the dust was blown to the west, covering Manhattan between the WTC and the Hudson River. Why these two particular locations should show such high peaks we cannot say - but the fact that they do and that so many radionuclides peaked at these locations is a major part of the evidence that the correlations do not come about by chance. Whatever nuclear processes were going on at those locations, it affected all the fission products as we would expect.

Permitted Barium and Strontium Concentrations

Strontium and Barium are extremely toxic elements and are not found in building products.

Permitted exposure levels to toxic substances in the building industry are regulated in the USA by OSHA. The permitted levels of exposure to

various substances for building and construction workers is specified in "Contaminants for Construction" section:

"1926.55 - Gases, vapours, fumes, dusts, and mists."

(a) Exposure of employees to inhalation, ingestion, skin absorption, or contact with any material or substance at a concentration above those specified in the "Threshold Limit Values of Airborne Contaminants for 1970" of the American Conference of Governmental Industrial Hygienists, shall be avoided. See Appendix A to this section.

<http://www.osha.gov/Publications/Homebuilders/Homebuilders.html>

The limit for Barium exposure is listed at 0.5 mg per cubic metre of air (since it comes beneath the permitted 0.5ppm level in dust and is therefore shown volumetrically) with a permitted maximum combined content of **15ppm** of dust. Therefore anything above 0.5 mg per cubic metre is a contaminant and protective equipment/clothing must be employed.

Therefore the maximum permitted level of Barium in a building or construction environment is 15ppm in dust - and less than 0.5ppm in a cubic metre of air.

The dust from the WTC contained 400ppm to 800ppm of Barium, with one sample containing 3670ppm.

The OSHA rules list over 400 hazardous substances to which building workers might be exposed. It does not even list Strontium because it is so unlikely that one would ever come across it in a normal building environment.

If Strontium was listed, it would have a safety limit lower than Barium because of its particularly dangerous effects. Strontium replaces Calcium in the bones and teeth. Prolonged exposure leads to brittle bones and replacement of the bone structure with a radioactive substance.

The Enhanced Radiation Bomb

An aspect of great concern is the high concentration of Zinc that was present in the dust. Where did it come from - and why does the variation in its concentration vary in a linear relationship with the concentration of Barium?

Clearly, if the source of the Strontium and Barium is a nuclear explosion, the source of the Zinc must also be that same nuclear device, since, as the reader has seen, the variation in Zinc concentration mirrors the variation in Barium concentration.

Do nuclear devices produce Zinc?

Nuclear reactors do produce some Zinc 65 but it is not a major fission product. However, there is not a great deal of data available on what happens when a nuclear reactor explodes like a bomb and any variations in the characteristics of the fission products that are produced compared with the normal controlled chain reaction.

However, there is a class of nuclear device that would produce a large quantity of Zinc: the Enhanced Radiation Bomb.

In 1950, the physicist Leo Szilard pointed out the theoretical possibility of building an atomic bomb that would be particularly lethal and has since been called the "Doomsday Device": the Cobalt Bomb.

In this type of weapon, the nuclear device is "salted" with a coating or jacket of another element. When the bomb explodes, the coating is subjected to intense radiation and is transmuted into a highly radioactive isotope of the element, which is then dispersed throughout the fallout zone of the bomb. The radiation produced by the device is enhanced, so that in addition to its explosive effects, the radiation damage to life is also magnified.

Different effects can be produced by using different salting agents.

In the Cobalt Bomb, a coating of Cobalt 59 would be used. This is transmuted into radioactive Cobalt 60 by the intense radiation exposure of the blast. With a half life of 5.26 years, the area affected by the fallout would be dangerously radioactive for many years. To some degree, the entire globe would be affected by the fallout.

Gold can be used to produce a high radiation zone for a few days, while tantalum and zinc produce a radiation zone that lasts for a few months.

Zinc 64 is seen as the "ideal" military salting agent, since it is cheap and produces intense radiation for only a few months. Some 48% of natural Zinc is composed of Zinc 64, the rest having atomic weights of 66 and above which is not useful for this application. When the bomb explodes, the Zn 64 is transmuted into highly radioactive Zn 65 to contaminate the fallout zone.

From The Nuclear Weapons FAQ by Carey Sublette¹:

"Zinc has been proposed as an alternate candidate for the "doomsday role". The advantage of Zn-64 is that its faster decay leads to greater initial intensity. Disadvantages are that since it makes up only half of natural zinc, it must either be isotopically enriched or the yield will be cut in half; that it is a weaker gamma emitter than Co-60, putting out only one-fourth as many gammas for the same molar quantity; and that substantially amounts will decay during the world-wide dispersal process. Assuming pure Zn-64 is used, the radiation

1. www.fas.org/nuke/new/nwfaq

intensity of Zn-65 would initially be twice as much as Co-60. This would decline to being equal in 8 months, in 5 years Co-60 would be 110 times as intense. "

Militarily useful radiological weapons would use local (as opposed to world-wide) contamination, and high initial intensities for rapid effects.

Prolonged contamination is also undesirable. In this light Zn-64 is possibly better suited to military applications than cobalt, but probably inferior to tantalum or gold. As noted above ordinary "dirty" fusion-fission bombs have very high initial radiation intensities and must also be considered radiological weapons.

If the Zinc in the WTC dust was produced by the nuclear explosion itself - i.e. as part of the fission of Uranium, it would in fact largely be highly radioactive Zinc 65 that would be produced.

However, there is far more Zinc in the WTC dust than any of the other usual fission products (i.e Strontium and Barium). Therefore, if that much Zinc was normally produced by an atomic bomb, there would be no need to salt them with more.

In addition to the ratio of Zinc present compared with the other fission products is the absolute quantity of Zinc (and indeed, the other fission products). Therefore, the presence of so much Zinc - between 1000ppm and 2000ppm and up to 3000ppm - indicates that indeed either a salted nuclear bomb was used or some other nuclear process was used to produce a very large amount of Zinc, as well as a very large amount of Strontium and Barium.

Where else could the Zinc have come from?

While the normal radioactive fission from a reactor or atomic bomb does produce Zinc 65, it is not a major product and the USGS discovered more Zinc present than any other trace element. At a minimum of 1000ppm of Zinc in the dust, with an estimated mass of concrete of 100,000 tonnes per tower, the mass of Zinc present would be in the order of at least 200 tonnes. Where could such a large quantity of Zinc have come from?

We put forward here three possibilities for consideration.

1. Radon Fission (or Ternary Fission)
2. Zinc Injection
3. Liquid Zinc Coolant

Radon Fission

We saw before that the concentration of Zinc in the WTC dust correlated very closely with the concentration of Barium. The relationship was almost linear, with an equation relating the two of:

$[Zn] = 4.4[Ba] - 538$ or $[Zn] = 3[Ba]$ to a close approximation.

The fact that the Barium and Zinc concentrations are linearly related indicates that they have a common source - that they were produced largely by a common process.

The atomic number of Barium is 56 and the atomic number of Zinc is 30. If an atom of Radon, with atomic number 86 was to fission, it could split into Barium and Zinc.

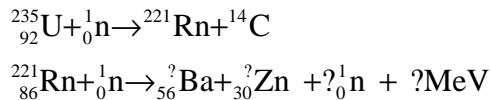
Radon is a Noble Gas and we know that when Uranium fissions, it favours pathways that pass through the Noble Gases. If Uranium with atomic number 92 splits into Radon with atomic number 86, the balancing atom will be Carbon with atomic number 6. Carbon 14 is a well known radioisotope produced by nuclear fission, and Radon is also definitely produced by fission of Uranium.

Radon is a naturally radioactive gas - all of its isotopes are radioactive and they all have short half lives under 4 days at the most. Since it is only 6 protons and 13 or 14 nuclear particles lighter than Uranium, it may also undergo fission like Uranium if subjected to neutron bombardment. This would be Ternary Fission of Uranium and would be expected under the intense energetic conditions of an underground nuclear blast.

So in the confined space of a nuclear reactor underground, it is possible that the Radon gas produced did not simply decay but underwent further nuclear fission itself into Barium and Zinc.

The process would look like this:

(EQ 11)



There would probably be a very large energy release from the fission of Radon and many excess neutrons would be produced - maybe 15 or more. If Zinc 65 and Barium 140 were produced, 16 spare neutrons would be released. This or a similar mechanism might be used in a neutron bomb.

If the large quantities of Zinc detected in the WTC dust were produced in this way, the Zinc would certainly have been composed of radioactive isotopes.

It is difficult to comprehend the mindset of those who would wish to design a nuclear weapon to do this. Not only would it be an enhanced radiation weapon designed to produce large quantities of neutron radiation - i.e. a Neutron Bomb - it would be a doubly enhanced radiation weapon that added high intensity Zn 65 radiation to its effects.

How much Uranium would be required to produce 200 tonnes of Zinc?

If all the Uranium in the reactor fissioned through one precursor (Radon) to Barium and Zinc, 723 tonnes of Uranium would be required. In fact, only a fraction of the Uranium would fission through this pathway, so far more Uranium would have to be originally present to create 200 tonnes of Zinc. Far more than 1000 tonnes would originally have been present - probably over 2000 tonnes.

This provides corroborative evidence that not one but two nuclear reactors exploded underneath the WTC. We will discuss this later in the report.

Zinc Injection

A technique known as Zinc Injection is widely used in Boiling Water Reactors (BWRs) across the world. All of the commercial nuclear reactors in the USA are of the BWR or Pressurised Water Reactor (PWR) type and all of the BWRs in the USA use Zinc Injection.

In Zinc Injection with a BWR, Zinc Oxide is injected into the water system which cools the reactor and which produces the steam for the steam turbines. This is done for three reasons:

1. To reduce the radiation exposure to the plant personnel from radioactive Cobalt 60.
2. To reduce corrosion and improve the mechanical properties of the stainless steel water piping and systems.
3. To improve cooling.

The technology is officially being evaluated for PWRs as well across the world, using Zinc Acetate instead of Zinc Oxide. The main cause of radioactivity exposure to the personnel in a PWR is Cobalt 60, so the use of Zinc Injection promises to reduce this danger.

Stainless Steel contains Nickel. Under exposure to beta radiation from the reactor, the Nickel 58 in the stainless steel pipes, heat exchangers, condensers etc. which form part of the power plant is transmuted into Cobalt 58, which in turn transmutes into Cobalt 60. These are both highly radioactive and dangerous isotopes. Therefore, Zinc Oxide is introduced into the coolant water. This displaces the Cobalt from the stainless steel and forces it out into the coolant water, where it can be filtered out. This reduces the long term radiation hazard to the personnel on site.

Over time, one can see that Zinc will build up both in the alloy structure of the stainless steel itself and as "fur" or scale on the insides of the tubing.

Over a lifetime of 30 or 40 years, perhaps a significant proportion of the Nickel in the stainless steel may be replaced with Zinc.

However, the Zinc Oxide used in reactors is Depleted Zinc¹ - that is to say the 48.8% of natural Zinc made up of the Zinc 64 isotope is largely removed to prevent its conversion into dangerous Zinc 65 by neutron radiation from the reactor. Therefore if the reactor went critical, most of

the Zinc present in the cooling system should not produce Zinc 65 or other dangerous Zinc isotopes. (Some radioactive Zn 69 may be produced from natural Zn 68). The concentration of ZnO used in the water coolant is also very low - in the parts per billion.

Therefore it seems unlikely that the Zinc in the WTC dust could have come from Zinc injected into the cooling system of the reactor, even if it had built up over the years in the associated stainless steel equipment.

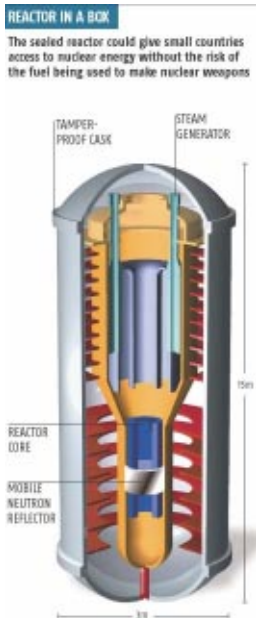
Liquid Metal Coolant

Another, more speculative possibility is that certain experimental fast breeder reactors might be using liquid depleted Zinc as the coolant.

It is well known that the "civilian" Fast Breeder Reactors (FBRs) under development all over the world at the moment use liquid sodium as the main coolant, which in turn heats water to drive the steam turbines.

However, the Russians have used molten Lead (Pb) to cool their nuclear submarine reactors since the 1950s. They are currently developing a new reactor design based on this technology (BREST) and the USA has plans for a range of reactors using liquid lead coolant as part of the 4th Generation Nuclear Reactor program now underway world-wide. This includes the SSTAR (Small Sealed Transportable Autonomous Reactor) which would be a small liquid lead cooled reactor producing less than 200MW of power. The physical size of the SSTAR units is said to be 15m high by 5m in diameter, weighing 500 tonnes, not including the electrical power generation equipment¹.

This is one of the attractions of the liquid lead technology: it favours small reactors for ships, submarines, desalination plants and other local area applications.

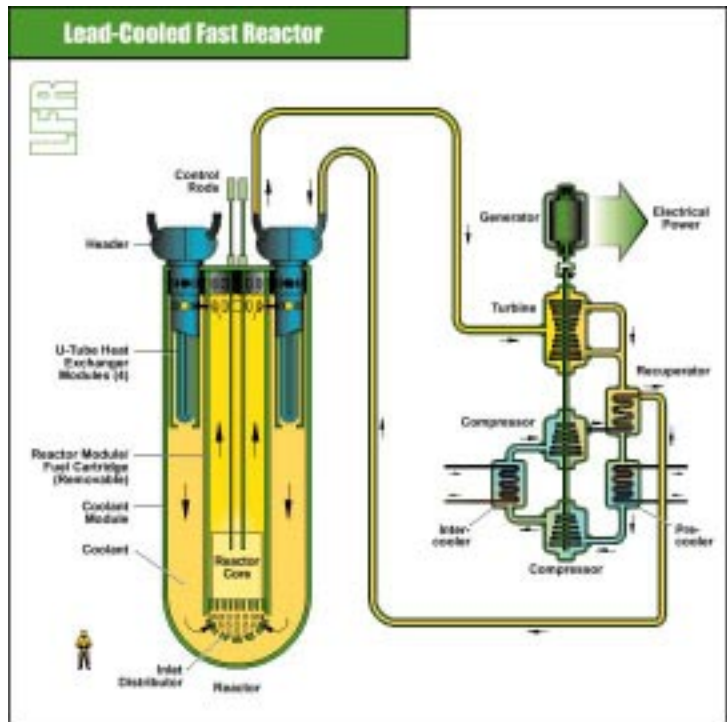


1. Depleted Zinc Products, EP-SSCM-64D2A, 17/7/02 Eagle Picher Technologies LLC. Note: the concentration of Sr, Ba and other trace metals in these ZnO pellets is less than 10ppm.

1. "US Plans Portable Nuclear Power Plants", New Scientist, 3/9/04

FIGURE 37

LIQUID LEAD FAST REACTOR



A nuclear reactor under the WTC and Manhattan would probably have been relatively small - certainly smaller than a normal power station but more like a nuclear submarine or nuclear ship reactor.

Could liquid depleted Zinc have been used as the coolant? What would be its advantages over Sodium or Lead?

The cooling properties of a liquid metal coolant depend primarily on its thermal conductivity.

Sodium has a low melting point of 371K and a high thermal conductivity of $141 \text{ Wm}^{-1}\text{K}^{-1}$ but a liquid density of only 928 kgm^{-3} , so quite a high volume of it is required. Liquid Sodium is also very dangerous due to its high corrosiveness and reactivity with water.

Lead has a higher melting point of 600K, a poor thermal conductivity of $35 \text{ Wm}^{-1}\text{K}^{-1}$ but a high density of $10,678 \text{ kgm}^{-3}$ so only a relatively small volume of it is required. Linear expansion problems with tubing, pipework etc. is also therefore reduced.

Zinc has a melting point of 693K, which is not much higher than Lead and a somewhat lower density of 6577 kg m^{-3} but a thermal conductivity of $116 \text{ Wm}^{-1}\text{K}^{-1}$, so it is a much better cooling agent than Lead.

Zinc might therefore be a good compromise between Sodium and Lead. Like Lead, it would be safer than Sodium, has only a marginally higher

melting point than Lead (which could be reduced with a ZnBi eutectic perhaps) and is almost as good a cooling agent as Sodium for a much lower volume. If it was used, "depleted" Zinc consisting of natural Zinc with the Zinc 64 isotope removed would be favoured.

We mentioned earlier that Fast Breeder reactors using Plutonium are much smaller than so-called thermal reactors, since no moderator is required. Conventional Fast Breeder reactors are usually Liquid Sodium cooled. Liquid metal cooling would therefore be expected with this type of reactor - and liquid Zinc coolant would make the reactor even more compact than liquid Sodium. It would probably be even more compact than a liquid Lead cooled Fast Breeder Reactor, since the lower density would be more than offset by the much better thermal conductivity.

Although this is speculative, it is certainly not beyond the bounds of possibility that depleted Zinc has been tried as a coolant for fast reactors, especially if it was in a clandestine military or quasi-military reactor.

Whatever the mechanism, the evidence clearly shows that a very large quantity of Zinc fallout was produced, the concentration linked to that of the other radionuclides - so the source of the Zinc was at the very least at centre of the nuclear blast if it was not a fission product. The fact that the Zinc concentration correlates with certain other trace elements, particularly Barium, might indicate that it was produced by fission - except there is a big difference in the girder coatings, with no Zinc present, which may mean the reactor under the South Tower was of a different type. The absolute quantity of Barium and Strontium present shows that the amount of fissile material (Uranium) that it derived from was far higher than would be found in any atomic bomb. Since the concentration of Zinc present lies in a direct linear relationship to the concentration of Barium, as well as other elements such as Lead - and the Barium was definitely produced by fission of Uranium or Plutonium, it is difficult to see how the Zinc could not have been produced by the nuclear fission process.

There must have been hundreds of tonnes of Uranium present to produce so much fallout. The only known source of so much Uranium is a nuclear reactor.

If the Zinc came from the reactor blast itself then it would be composed to a certain extent of the dangerous Zn 65 isotope. If it came from Zinc Oxide injected into the water coolant or a speculative liquid Zinc coolant, one would expect the Zinc in the dust to not contain Zn 65 and therefore not be too dangerous. If it came from another source of Zinc - some large machinery containing natural Zinc that was exposed to the neutron radiation blast - then the Zinc fallout would be approximately 50% comprised of the dangerous Zn 65 isotope.

Given the high correlation of [Zn] to [Ba], the most likely explanation for the source of the Zinc is Ternary Fission of Uranium, i.e. further fission of the radioactive products in the intense underground nuclear blast.

3.8 Conclusion

The presence of nuclear fission fallout in the WTC dust is sufficient in itself to prove that the Twin Towers of the WTC were subjected to a nuclear explosion.

The presence in high quantities of rare nucleides that are characteristic of nuclear fission and which should not be present in building material at all, let alone in such high levels, and where the concentrations statistically and mathematically relate to each other as would be expected from nuclear chemistry, means that no other conclusion can be reached: the towers were brought down by the blast of a nuclear device.

The presence of extremely high levels of Zinc is a cause for major and serious concern, as if ordinary nuclear fission was not serious enough. The presence of such high quantities of Zinc shows that the nuclear explosion may have had the same effect as an enhanced radiation bomb, specifically designed to maximise the radiation exposure to the target population. If this Zinc was produced by the fission of the nuclear material itself or came from another source of natural Zinc which was then subjected to the nuclear blast, the damaging effects will be severe. If it was originally from a source of "depleted" Zinc then the presence of so much Zinc fallout would not be so serious.

As we have said, the linear correlation of the Zinc concentration to the Barium concentration (and other fission products) does tend to indicate that the Zinc in the dust was indeed a fission product and would therefore have been composed of dangerous radioactive isotopes. This is certainly not a normal well known fission pathway from the normal operation of a nuclear reactor.

We put forward the speculative possibility of a "Radon Bomb" that could account for the linear correlation between the Zinc and Barium in the dust. If the Zinc was indeed a fission product, the device that produced it must have been specifically engineered to produce it: the reactor must have been specially set up or an even more exotic device consisting of hundreds of tonnes of fissile material was designed. This device then produced mostly neutrons and enhanced radiation fallout with a relatively small blast in comparison with the mass of fissile material present.

We may well be looking at the signature of a very "advanced" nuclear device or a reactor carefully set up to produce maximum radiation damage.

In the Sierra Club's report¹ is the following quote from Marianne Horinko, Acting EPA Administrator at the time of the WTC disaster in an interview with MSNBC:

"I pray to God that in the event of another terrorist attack, God forbid, we as an agency would be equipped to get the data analysed and posted to the public. God forbid there is a dirty bomb".

1. "Pollution and Deception at Ground Zero" Sierra Club, P181

4

The Seismographic Evidence

4.1 Introduction

When the WTC collapsed, seismic waves were recorded by a large number of seismographic monitoring stations across the eastern USA. These seismograms provide very important and compelling evidence in support of the conclusion that the Twin Towers were destroyed by nuclear explosions. We will review this evidence in detail here.

Hundreds of earthquakes are occurring continuously across the world every day. Most of these are small and go unremarked, except by the seismograms which record the shocks waves as they pass through the Earth.

However, the seismographic picture produced by an unnatural "earthquake" - such as the detonation of explosives in a quarry or mine or an underground nuclear explosion - is very different and distinctive compared to that caused by a naturally produced earthquake. It is very easy to see the difference and indeed the underground nuclear tests carried out by India in 1998 and then by Pakistan were first detected and brought to public attention by independent seismologists.

Seismographic data recorded by a global network of earthquake monitoring stations is routinely used to monitor compliance with the Nuclear Comprehensive Test Ban Treaty. The US centre for this work is at the Lawrence Livermore National Laboratory.

What are Seismic Waves

Seismic Waves are generated in the earth by both natural earthquakes and artificial events such as routine quarry blasts. In seismographic surveying, special devices such as hydraulic hammers or explosive charges are used to generate seismic waves to map the underground strata.

Seismic Waves are divided into two categories - Body Waves and Surface Waves. Body Waves are further subdivided into P or Primary Waves and S or Secondary Waves and travel within the interior of the Earth.

Surface Waves are also comprised of two types - Love Waves and Rayleigh Waves. These only travel along the surface of the Earth. Most of the shaking felt from an Earthquake is caused by the Rayleigh wave.

TABLE 5

TYPES OF SEISMIC WAVE

| TYPE | SUB-TYPE | | DESCRIPTION |
|---------------|-----------------|---------------------|--|
| Body Waves | Primary Waves | Secondary Waves | Travel within the interior of the Earth. P Wave faster but weaker than S Wave. |
| Surface Waves | Love Waves (Lg) | Rayleigh Waves (Rg) | Travel on the surface of the Earth |
| | | | |

The characteristics of the waves detected by a seismograph allow one to determine what sort of event caused the earthquake and whether it was natural or not.

4.2 What is the Difference between an Earthquake and an Explosion?

There are some key differences between the seismic picture of a natural earthquake and an underground explosion.

P Waves vs S Waves

One method of telling the difference is to look at the ratio of S waves to P waves. Explosions create strong P waves and weak S waves, whereas natural earthquakes produce relatively weak P waves and strong S waves. However, the relative difference is much greater with explosions than with earthquakes: the P wave in the Indian nuclear tests was 10 times as strong as the S wave (i.e. its amplitude was 10 times higher) while for natural earthquakes originating in the region, the P waves range from 3 times as strong as the S waves to 4 times as weak as the S waves.

Another key signature is that an explosion is of course an impulsive event - the biggest pulse of energy is produced at the beginning, when the explosive is detonated. Before that, there will be nothing so the first the seismograph knows about it is when it receives a maximum amplitude signal out of nowhere, then followed by lesser vibrations as the reverberations produced by the explosion die away.

In contrast, with a natural earthquake, due to the different propagation speeds of the S and P waves, the faster P wave of lower strength arrives first, followed by the slower but stronger S waves, which creates a build-up of energy as the earthquake progresses.

Therefore we see the following types of pattern:

FIGURE 38

INDIAN NUCLEAR TEST vs EARTHQUAKE¹

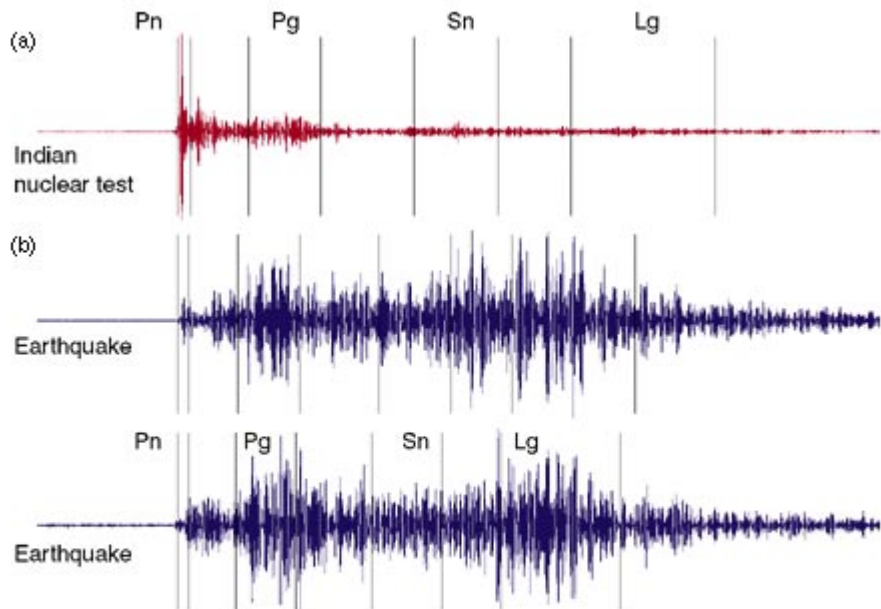


Figure 5. An international monitoring station in Pakistan detected the Indian nuclear test of May 11, 1998, about 740 kilometers away. (a) Analysis of the seismogram showed a P-wave-to-S-wave ratio strongly indicative of an explosion and not (b) nearby earthquakes.

One can very clearly see the difference between the natural earthquake and the nuclear explosion. The artificial explosion is very distinctive, with a pulse of maximum amplitude occurring right at the beginning followed by a tail off as the reverberations die away. This is also what common sense tells us we would see.

In a natural earthquake, we see a whole series of new shocks occurring over a period of time, as the plates in the Earth's crust move and slide over each other. Again, we can easily understand why we see this picture.

Distinctive Picture

Figure 38 shows us that an underground explosion produces a very distinctive seismographic picture. We see a peak or shock at the beginning as the explosion blasts into the ground, followed by a falling off as the reverberations die away.

We cannot tell from this picture if the explosive device was nuclear or conventional, but from the Magnitude of the shock we can estimate how

1. Figure 5 from <http://www.llnl.gov/str/Zucca.html>

powerful the explosion was, i.e. how much TNT or TNT equivalent must have been used.

Surface Wave Pattern

Apart from the Body Wave pattern, the Surface Wave pattern is also distinctive. It is well established in seismology that quarry blasts near the surface mainly produce high frequency Rayleigh Waves (Rg), one of the two types of Surface Wave, at nearby monitoring stations. Impact sources such as seismic hammers on the other hand tend to produce Low Frequency Surface Waves.

The differences between natural or non-explosive seismic sources and explosive or impulsive seismic sources is summarised in the following table.

TABLE 6

| | Body Wave | Surface Wave |
|-----------------------------|--|----------------------|
| Non Impulsive Source | P and S Waves more or less balanced | Low Frequency Waves |
| Impulsive Source | P Wave very strong S Wave very weak or absent | High Frequency Waves |
| | | |

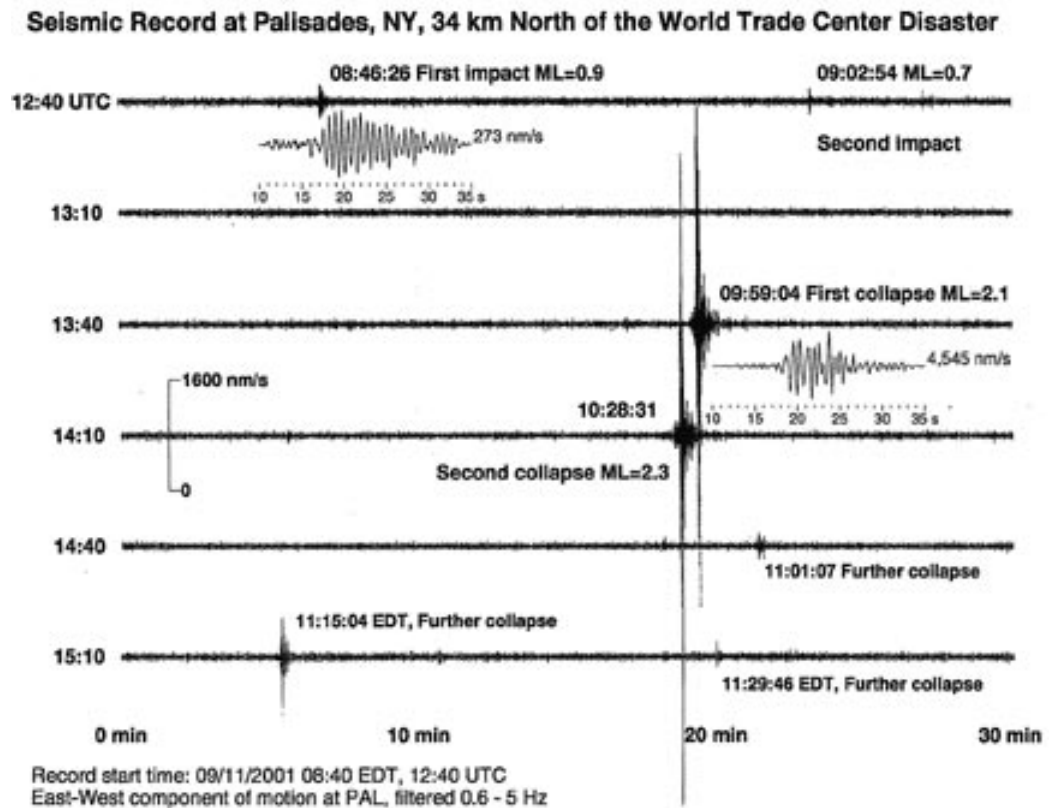
4.3 Seismographic Analysis of the WTC Collapse

The University of Columbia's Lamont-Doherty Earth Observatory earthquake monitoring station in Palisades N.Y., 21 miles north of the WTC, recorded the seismic waves generated by the impact of the aircraft and the collapse of the Twin Towers of the WTC. In total, Lamont-Doherty operates 34 seismograph stations in the eastern USA and the seismic waves from the WTC collapse were recorded by at least 13 of the stations, up to 428 km away.

The official explanation for the seismographic readings is that when the Twin Towers collapsed onto the ground, caused by the simultaneous melting of all 47 central steel box columns by burning kerosene, the falling rubble generated seismic waves which were then picked up by local seismographs.

The seismographic recording made at the Lamont-Doherty Earth Observatory in Palisades is reproduced below.

FIGURE 39



In their report¹, the 12 geologists from the University of Columbia make a number of interesting and revealing observations about the nature of the seismic footprint and the events that must have caused them.

The first interesting remark they make in the introduction is that they found they had recorded numerous seismic signals from the “two plane impacts and building collapses from the two WTC towers, often at times different than those being reported elsewhere”.

Why were the times of the seismic signal recordings often different from those being reported “elsewhere”?

The official times of the two aircraft impacts are 08:45 to 08:46 for Flight 11 (North Tower) and 09:03 for Flight 175 (South Tower).

The Palisades recorded very significant seismic spikes of M_L 0.9 and 0.7 at 08:46 and 09:03 - 21 miles away from the WTC. This is close enough that the seismic waves from the towers would be detected

1. “Seismic Waves Generated by Aircraft Impacts and Building Collapses at World Trade Center, New York City”, http://www.ideo.columbia.edu/LCSN/Eq/20010911_WTC/WTC_LDEO_KIM.pdf

within seconds, so the Palisades measurements do not diverge from the official times of the aircraft impacts.

The same applies to the collapse of each tower. The official times are 9:59 for the South Tower and 10:29 for the North Tower. The Palisades measurements of the two large spikes were at 09:59:04 and 10:28:31.

However, the seismogram (Figure 39) shows 3 further impulsive shocks at 11:01:07, 11:15:04 and 11:29:46 - all as large or larger in amplitude than the shocks detected coincident with the crashes of the aircraft. The shock at 11:15:04 is particularly large.

These further shocks have never been mentioned or explained. What caused them?

They then remark that the collapse of the North Tower was the largest seismic source, with an estimated local Richter Magnitude¹ of M_L 2.3. They then say:

“From this we infer that ground shaking of the WTC towers was not a major contributor to the collapse or damage to surrounding buildings, but unfortunately we also conclude that from the distance at which our detections were made it is not possible to infer (with detail sufficient to meet the demands of civil engineers in an emergency situation) just what the near-in ground motions must have been”.

They make this comment to answer certain questions that were raised as to whether any ground shaking produced when the towers collapsed could have weakened or caused other buildings (such as Building 7) to collapse later. Evidently, the collapse of the WTC towers did not weaken Building 7.

The public explanation is that the seismic shocks were generated by the impacts of the WTC buildings themselves with the ground. However, Lamont-Doherty make it clear that they could not tell what the near-in ground motions were.

They then tell us that “Surface waves were the largest seismic waves observed at various stations. The presence of seismic body waves is questionable even at Palisades...they are not observed at other stations”.

Therefore, body waves (P and S waves) were not really detected at all. Only surface waves were detected. This is very important - bear this in mind.

The next important observation made is that ‘The predominant signals at distances greater than 200km are short period surface waves

1. M_L means Local Richter Magnitude - i.e. the magnitude of the seismic event at the locality where it originated.

propagating at... the typical L_g group velocity". They then refer to the six close in seismic stations in the Metropolitan New York region: "unlike the signals at distant stations, the predominant waves are surface waves of short period (about 1s) called R_g ".

This tells us that the distant stations recorded short period or high frequency Love Surface Waves while the close stations recorded short period or high frequency Rayleigh Surface Waves.

The most important point is that all of the seismic waves detected, which were all surface waves, were High Frequency Waves.

As we said before, it is well known in seismology that for **explosions near the surface, such as quarry blasts, the dominant waves received at local seismographic stations will be short period Rayleigh (R_g) waves**, where short period means 0.2 to 5 seconds. A short period means a high frequency.

Therefore **the characteristics of the seismic waves from the WTC collapse match those from quarry blasts.**

The next very important point they make is that "A truck bomb at the WTC in 1993 in which approximately 0.5 tons of explosive was detonated was not detected seismically even at a station 16km away". The explosive used was apparently urea nitrate, which is a relatively weak explosive.

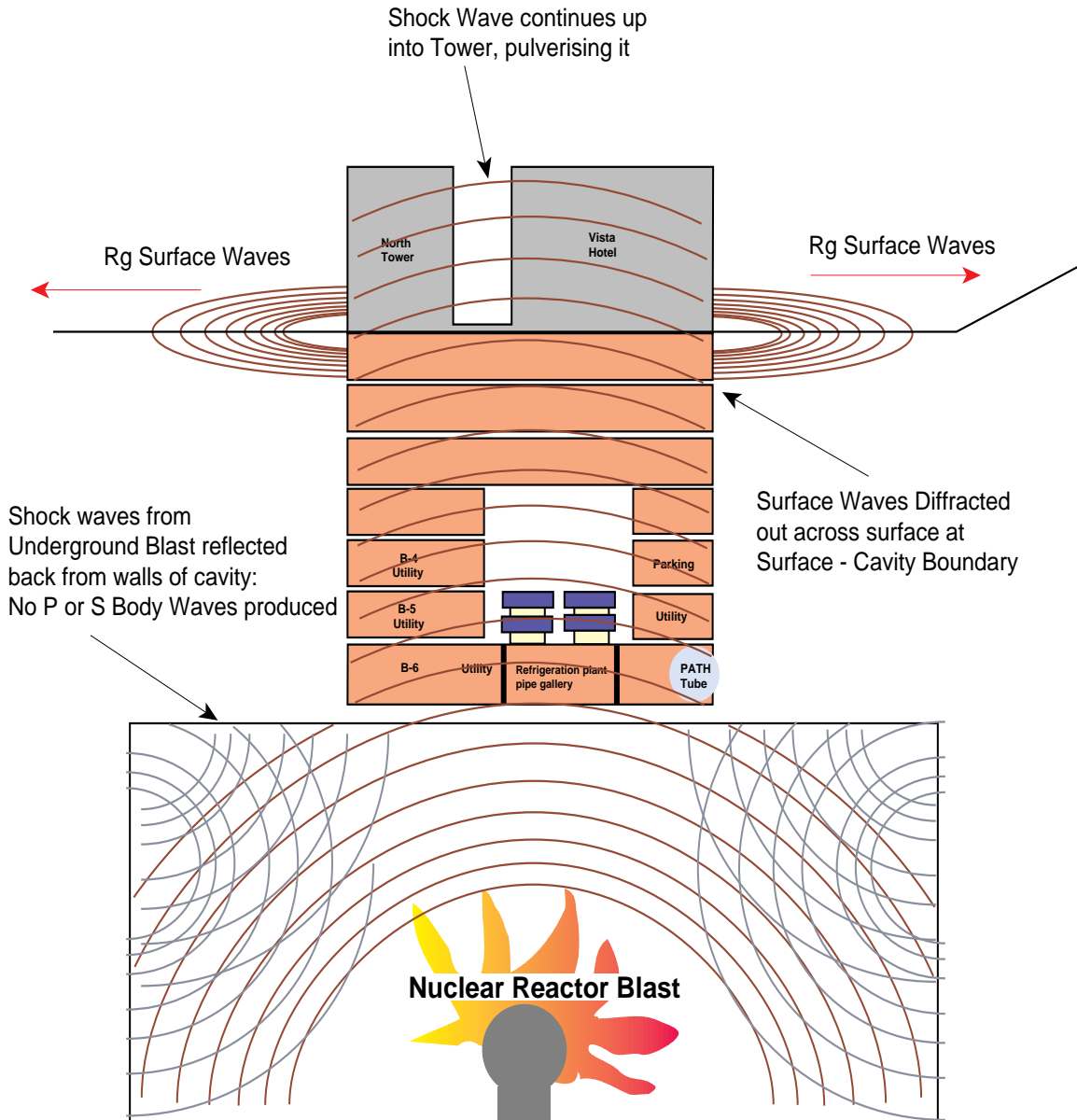
This truck bomb was detonated under the North Tower in the level B2 car park. However, the sub-basement levels evidently acted as a big cavity to attenuate coupling to the surrounding earth, so that nothing was detected even at a close-in station 10 miles away.

The implication of the lack of detection of seismic waves from the 1993 event is that seismic events - such as explosions or the falling of rubble onto the surface - would not propagate well through the ground strata from the WTC site. When the WTC was constructed, a bathtub shaped hollow was excavated out under the entire site to house the underground facilities. The two towers therefore sat on an underground cavity. This would attenuate effectively the shock of any rubble falling onto the surface, as well as the seismic effect of a bomb in the basement.

This is why no Body Waves that travel through the interior of the Earth were detected from the collapse of the WTC on 9/11. However, the explosion this time from a nuclear blast was thousands of times more powerful than that produced by 0.5 tonnes of the relatively weak explosive urea nitrate. Therefore, although the seismic waves generated by the blast inside what is in effect an enormous cavity under the WTC could not propagate very well into the interior of the Earth as body waves, they would still create "ripples" on the membrane-like surface of the Earth - producing the observed high frequency surface waves, with exactly the same characteristics as a quarry blast close to the surface.

This scenario is illustrated in the schematic below.

FIGURE 40 SEISMIC WAVE PROPAGATION AT THE WTC



A nuclear reactor situated another 50 metres below the B-6 level would have better coupling to the ground than an explosive in the middle of the basement cavity. Therefore the central supporting columns of the tower would be well coupled to the explosive shock and conduct it up to the top of the tower. The blast would also follow the line of least resistance up through the relatively flimsy concrete floors of the basement levels and into the tower and then be propagated out in ripples across the surface of the Earth by the foundations of the tower as they were hit by the shock wave.

Lamont-Doherty then go on to say that:

“An explosion at a gasoline tank farm near Newark on January 7 1983 generated observable P and S waves and short period R_g waves at PAL. Its R_g is comparable to that for WTC collapse 2”.

So an explosion at a petroleum storage depot in the vicinity also produced short period/high frequency R_g waves, like the WTC, which are characteristic of near surface explosions. Unlike the WTC it also produced body waves, but we have already seen that an explosion under the WTC in 1993 did not produce body waves. This we have explained by the underground cavity, which prevents body waves from forming. The gasoline tank farm would not be situated on top of a cavity and hence body waves were also produced. The statement “Its R_g is comparable to that for WTC collapse 2” is thinly veiled code for “the tower was subjected to an explosion”.

Seismologists frequently need to produce seismic waves artificially to explore or analyse underground strata. There are two main approaches to doing this. The first is to use an “impact source”, which uses a large mechanically driven hammer to hit the surface of the ground. The seismic waves emitted can then be monitored and picked up by local detectors.

The other approach is to bury small explosive charges in the ground. When they are detonated, seismic waves are generated which can be used to explore and analyse the underground geological strata.

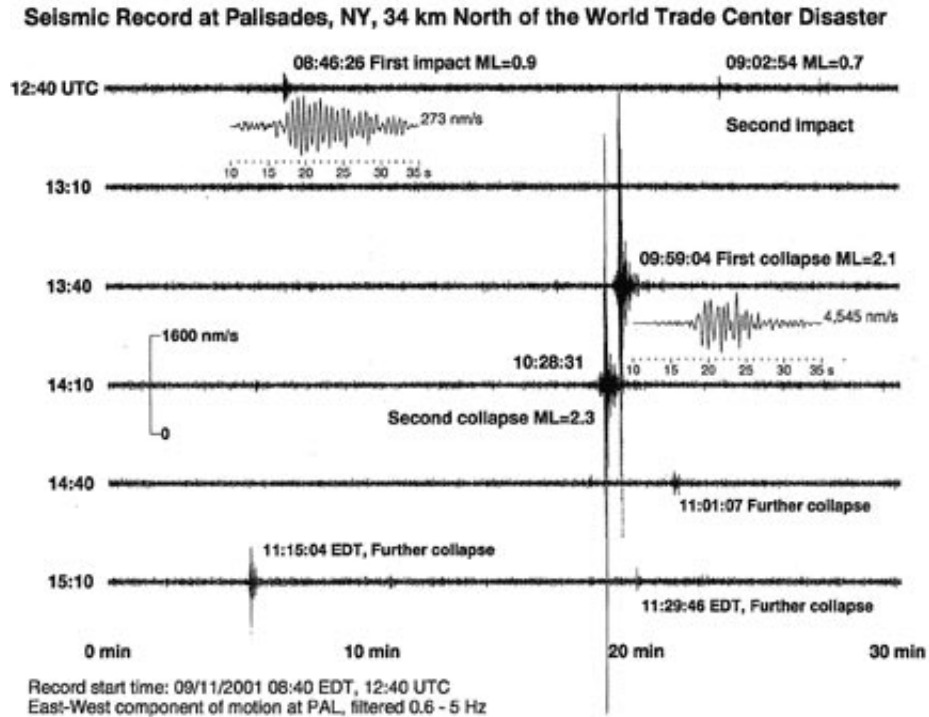
It is well known in seismology that Impact Sources produce Low Frequency Waves while Explosive Sources produce High Frequency Waves.

The Seismic Waves produced during the WTC collapse were High Frequency Waves - again indicating that they could not have been produced by the impact of rubble on the surface, but rather by an impulsive explosive source.

Further Commentary on The WTC Seismogram

The seismogram recorded at Lamont-Doherty is reproduced again below.

FIGURE 41



The seismograph recorded two very large spikes at 09:59:04 and 10:28:31, immediately preceding the collapse of each tower. There was also a relatively large spike, of the same form, at 11:15:04, not to mention two other smaller shocks at 11:01:07 and 11:29:45.

The first two small shocks at 08:46:26 and 09:02:54 are also very intriguing. These have a local Richter magnitude of M_L 0.9 and M_L 0.7 and apparently occurred at the same time as the impact of each aircraft with the towers. However, it would be absolutely impossible for the impact of the aircraft near the top of each tower to generate a shockwave of that magnitude at the base.

We can immediately see that the two big shocks of M_L 2.1 and 2.3 have the same form as that of an underground explosion, with a single very large impulsive spike near the beginning of the signature.

(The blast signature also tails off or is attenuated very quickly, as if there is significant damping between the explosive source and the surrounding ground, which there would be at the WTC).

The official explanation for this, if it is addressed at all, is that the collapse of the buildings themselves created this impulsive shock.

However, if this was the case, one would expect to see the magnitude of the shock wave rise up to a maximum as more and more building material hit the ground and then tail off as the volume of falling material reduced, finally tailing off to nothing.

The 110 storey towers fell at practically the rate of free fall; therefore their structural integrity was removed instantaneously. (This is standard procedure in a Controlled Demolition). If one imagines standing an open ended glass cylinder on a table on its end and filling it with damp sand, and then quickly pulling the cylinder up and away, the sand would fall down onto the table in an increasing avalanche, then tail away as the last of the sand fell.

However, what was actually recorded is the classic signature of a short, sharp shock - something impacting the ground all at once with great force right at the beginning, with then a great reduction in the amplitude of the seismic wave afterwards after the energy source has been expended. We only see some acoustic waves before the main spike arrives due to dispersion of the shock wave as it travels through the ground - the lower frequency waves generated by the shock travel faster so they arrive before the higher frequency waves - so we see some "spreading out" of the main impulsive shock.

Pulse Duration

Lamont Doherty also state that:

"Thus, we conclude that the pulse duration reflects mainly that the generation of seismic energy from the collapse was delivered over 5 - 6 seconds".

The duration of the shock generating event which produced the M_L 2.3 and 2.1 spikes was estimated at 5 to 6 seconds. It was a single impulsive, short duration shock, similar to the earth being "hit" by a large impact.

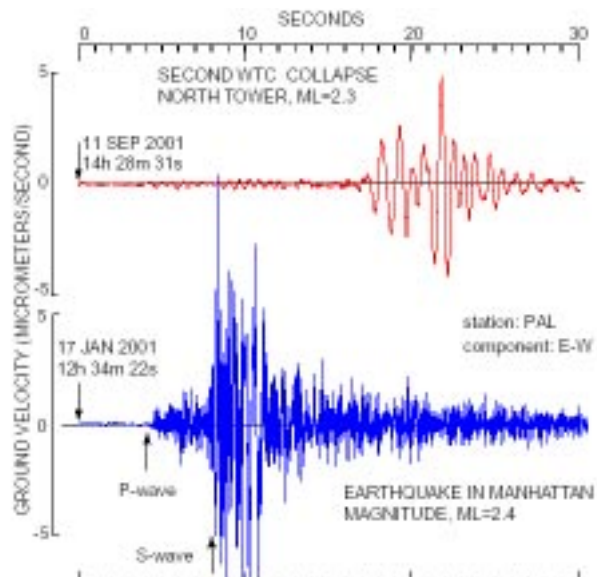
We therefore have confirmation that it was not a long drawn out event over maybe 30 seconds as we would expect, if it was the collapsing rubble itself which generated the seismic waves.

P Wave vs S Wave Profile

The geologists then go on to compare the signals with those from a small earthquake under Manhattan on the 17th January 2001 of comparable M_L . They point out that "the character of the two seismograms is quite different. Clear P and S waves are seen only for the earthquake".

Figure 42 below (Figure 4 from the Lamont-Doherty report) shows this. The earthquake is at the bottom, the second WTC tower collapse at the top. The typical earthquake pattern of the M_L 2.4 Manhattan earthquake in January 2001 shows both S and P waves, while the pattern for the second tower collapse is devoid of S and P waves. It is of a transverse surface wave type. In other words, it is of the type of pattern one obtains from an underground explosive blast.

FIGURE 42



They also discuss the Rayleigh waves produced by the collapse: the largest R_g waves detected were short period (high frequency) waves, which are characteristic of a surface or very shallow source “which is the case for the WTC” they say. So they confirm that the source of the seismic shaking was at or just below the surface. These are also the types of waves predominantly produced by quarry blasts.

Another interesting comment was that the collapses and falling debris had an effect “except for temperature, an effect very similar to **pyroclastic** ash flows that descend slopes of volcanoes”.

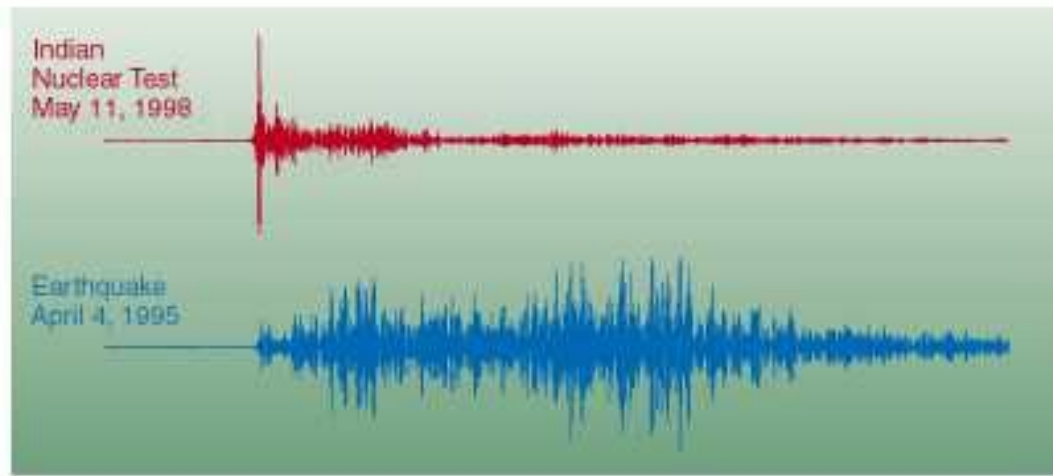
(In fact, we know from eyewitness accounts that the dust was indeed very hot, sizzling in fact and that it set fire to organic material as it spread out from the collapse).

4.4 Comparison with Nuclear Test Seismograms

We will now compare the WTC seismogram more closely to known seismograms from underground nuclear explosions.

Figure 43 is another seismogram from the Lawrence Livermore National Laboratory Nuclear Test Monitoring¹ department comparing the Indian Nuclear Test of 11th May 1998 to a local earthquake.

FIGURE 43



According to the Lawrence Livermore Laboratory:

“Figure 2. Seismogram of the Indian Nuclear Test and a representative nearby earthquake. These seismic signatures for an earthquake and an explosion are typical and clearly distinguish one from the other”.

The signature for the Indian Nuclear Test of 11th May 1998, described above as “typical” for an explosion, appears to be practically identical to the signature from each WTC collapse.

An argument that has been brought against this is to say that the timescale of the WTC seismogram and the Indian Nuclear Test seismogram is different. It is postulated by detractors that the timescale on the WTC seismogram has been compressed, making it appear that an impulsive spike was produced, like the atomic bomb seismograms, when in reality the WTC collapse took place over a longer period of time than the Indian atomic bomb seismograms and therefore the “spike” is an artefact.

1. “Seismic Monitoring Techniques put to a test”
<http://www.llnl.gov/str/Walter.html>

We categorically refute this with three points.

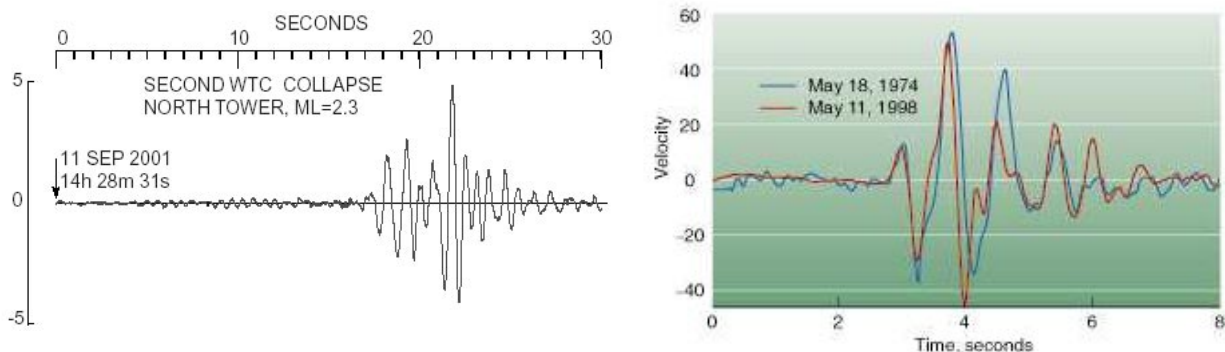
First, Lamont-Doherty tell us explicitly that the duration of the entire event which generated the seismic energy was 5 to 6 seconds.

This would seem to be of the order of duration one would expect for an underground nuclear blast. Explosions are not long drawn out events taking place over minutes like earthquakes - they happen in microseconds or milliseconds and with a shock wave from an underground nuclear blast travelling out at maybe a few thousand metres per second, a few seconds would be all it would take for the bomb to vaporise the ground to create an underground cavern or crater.

The length of time it took for the towers to collapse was also significantly longer than 5-6 seconds; the towers took 8 seconds and 10 seconds to fall.

Secondly, both Lamont Doherty and Lawrence Livermore provide us with a detailed and distinctive Velocity Profile analysis for their seismograms.

FIGURE 44



The Velocity Profile on the right is called “Signals for the Indian 1974 and 1998 Indian Underground Nuclear Tests recorded in northern Canada”.

On the left we see the Velocity Profile from Figure 4 of the Lamont-Doherty Report of the WTC collapse (without the earthquake comparison in Figure 42).

The timescale of each is also similar: about 5 seconds from start to finish for the Indian tests and 10 seconds for the WTC. This would vary depending on the magnitude of the explosion and the intervening rock strata.

Therefore far from the WTC seismogram having been compressed, it is actually somewhat *spread out* compared to the seismogram from the Indian nuclear test.

It has been argued by debunkers (at least one highly “qualified”) that the spike on the WTC seismogram was an artificial artifact created by compressing many spikes that took place over a longer period of time into a shorter timescale, by using a shorter time scale on the x axis. But as we have just seen above, the event which created the WTC spike took place over twice as long a period as the Indian nuclear test which also produced a spiked seismogram. The “spike” in the WTC seismogram therefore has to be a real event, not an artefact.

Third and most damning, the whole argument that compressing the timescale would produce a spike is risible. If the absolute magnitude of the shockwave was low at all times, then no amount of compressing the timescale along the x axis is going to expand the amplitude along the y axis. Think of folding up a concertina. Opened out, the end boards have a certain height; closed up, it is now very thin but the end boards still have the same height. Compressing all the leaves together does not make them add up their height.

The WTC seismograms are in fact damning evidence in their own right. They show exactly the same pattern as an underground nuclear blast.

Discriminating Between Explosions and Earthquakes

We quote here from the Lawrence Livermore website:

“Livermore seismologist Bill Walter explains that the differences in seismic P- and S-wave energy provide one method of discriminating explosions from earthquakes. Seismic P waves are compressional waves, similar to sound waves in the air. Shear (S) waves are transverse waves, like those that propagate along a rope when one end is shaken. Because underground explosions are spherically symmetric disturbances, they radiate seismic P waves efficiently. In contrast, earthquakes result from sliding or rupture along a buried fault surface and strongly excite the transverse motions of S waves. Thus, we expect that explosions will show strong P waves and weak S waves and that earthquakes will show weak P waves and strong S waves, as seen in Figure 2.

This is another important indication. We can therefore say that if it had been the collapse of rubble and the debris of the towers themselves that had caused the seismic waves, that would NOT have been spherically symmetrical. Collapsing rubble should therefore produce mostly S type Body Waves and low frequency Surface Waves (R_g). Only High Frequency R_g Surface Waves were in fact detected.

What would we have expected from the fall of a building, assuming it could produce enough coupling of seismic energy to produce measurable or detectable seismic waves at a distance?

A more or less smooth increase to a maximum intensity and then tailing off as the building fell to the ground, more rubble descended on top and then the fall of rubble decreased and ceased.

We would not expect to see a sharp spike as if the whole weight of the building was lifted up and then deposited back onto the ground. Though conceivably this might arise from a controlled demolition in which the building was literally repositioned with explosives before collapse. This is an art in which specialists in this field are skilled.

Since the towers were largely pulverised to dust and did not cast large pieces of the structure onto the ground, it is difficult to see how they could have created significant seismic waves.

As one of the authors of the Lamont-Doherty report, Arthur Lerner-Lam, stated in an interview¹, the energy of the building falling was not sufficient to generate appreciable seismic waves - most of the energy went into the dust and rubble itself.

Therefore another energy source - an impulsive shock energy source - must have been responsible for the generation of the M_L 2.3 and 2.1 spikes observed by the earthquake monitoring stations.

4.5 Energy Balance

The energy balance between that required to produce the observed seismic waves and that available from the collapsing towers is also revealing.

If an object is dropped from a height so that it hits the ground, seismic waves containing a certain amount of energy will be generated. The source of the energy for those seismic waves can only come from the original energy of the object. That original energy is called its "gravitational potential energy" and is equal to the mass of the object multiplied by its height above the ground multiplied by the acceleration due to gravity.

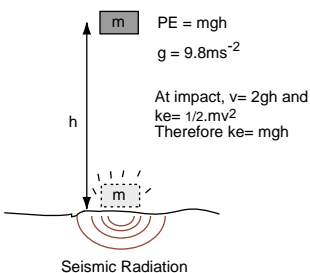
As the object falls, that "potential energy" is converted to kinetic energy; finally, some of that kinetic energy is converted into the energy of the seismic waves when it hits the ground.

Gravitational Potential Energy of WTC

The geologists estimated that the gravitational potential energy of each tower was in the order of 10^{11} Joules.

(The gravitational potential energy in this case is the mass of the building multiplied by the acceleration due to gravity g (9.8 ms^{-2}) multiplied by the mean height of the building - or more accurately, we would integrate the weight of each floor multiplied by its height and g .)

Conversion of Potential Energy (PE) to Kinetic Energy (ke)



1. See Appendix to this chapter

This is in accord with other estimates, which put the mass of each tower at 160,000 to 180,000 tonnes. With a height of some 400 metres, one can take the mean height and multiply by the mass of the tower and the acceleration due to gravity which gives a gph in the range of 3.1 to 3.5×10^{11} Joules.

Another way of looking at it is to estimate the kinetic energy of the towers as they fell. Professor Cahill (q.v.) put this as “180,000 tonnes moving at 120mph” which is 2.6×10^{11} Joules.

Lamont-Doherty then estimate that the amount of energy radiated in the seismic waves was about 10^6 to 10^7 Joules. “Hence only a very small portion of the potential energy was converted into seismic waves. Most of the energy went into deformation of buildings and the formation of rubble and dust”.

Conversion of Potential Energy into Seismic Energy

Conversion of “potential energy” into other forms of energy is very, very inefficient. The term “Seismic Efficiency” or “Coupling Factor” is used to denote how much of the energy of an impact source is actually converted into Radiated Seismic Energy.

In analyses of events such as underground rock falls, mine collapses, meteorite impacts etc, a Seismic Efficiency of between 10^{-5} to 10^{-3} is often quoted. A mean estimate of 10^{-4} is frequently used. This means that only 0.01% of the original gravitational potential energy or kinetic energy of a falling body is converted into the energy of seismic waves when it hits the surface.

However, this is for a body that makes a clean unimpeded impact with the ground, like a seismic hammer.

In the case of the WTC, the building was pulverised into dust as it fell. The geologists tell us that much of the gravitational potential energy of the building was absorbed by the deformation of the buildings themselves and the formation of the rubble and dust. The entire weight of the building was not picked up and dropped onto the ground like a solid block. The seismic effect of a ton of dust will also be far lower than a ton of solid concrete.

Therefore the radiated seismic energy would be lower than 0.01% of the gravitational potential energy of the building because much of that gravitational potential energy was first absorbed by the disintegration of the buildings as they fell.

The radiated seismic energy was in the order of 10^6 to 10^7 Joules, while the gph was in the order of 10^{11} Joules. Multiplying the general Seismic Efficiency of 10^{-4} by the gph of 10^{11} gives us 10^7 Joules. But to that we have to first take off the amount of gph used in the disintegration of the buildings themselves.

How much energy was required to pulverise the WTC?

Energy to Pulverise WTC

This can be approximately calculated for a concrete column by multiplying the Tensile Strength of concrete by the length of the column and the cross sectional area of the column. This will give the amount of energy required to completely tear the column apart.

The Tensile Strength of concrete varies between 1.4 and 14 MN/m². We will use a low value of 5 MN/m². The height of the towers was some 400 metres. We will use half of that, to assume that only half of the concrete at the most was pulverised. As for the cross sectional area of the concrete column we will use to represent the tower, we will use a very, very conservative value again of 10m on a side. The WTC was actually 207 feet or 62.7 metres square. Its concrete supporting columns were certainly far more than 10 metres square in total. So this analysis is purely indicative and very conservative.

We can therefore now calculate the energy required to pulverise a concrete column 200 metres long, with a cross sectional area of 100 square metres.

$$\text{Pulverisation Energy} = 5 \text{ MN/m}^2 \times 200\text{m} \times 100 \text{ m}^2$$

This comes to 1×10^{11} Joules.

This is of the same order of magnitude as the total initial gravitational potential energy of the towers themselves. Indeed, our conservative estimates indicate that more energy was required to pulverise the concrete than could possibly have been supplied by the entire gravitational potential energy of the towers.

Therefore, there is a significant deficit between the energy required to pulverise the buildings and create the seismic waves and that available from the initial potential energy of the buildings.

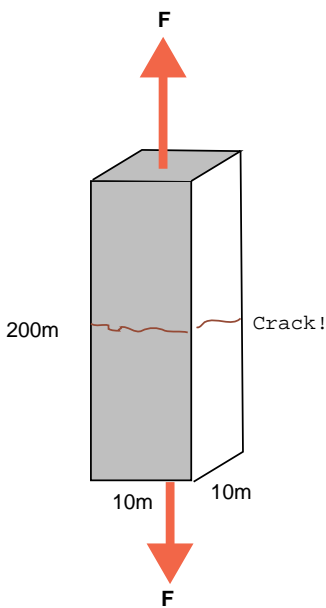
Seismic Efficiency

A further insight into “seismic efficiency” is presented here.

When the ship¹ “Edmund Fitzgerald” sank in Lake Superior in 1975, 26,000 tonnes of iron ore fell onto the lake bed at a depth of some 500 feet. The *gph* of the iron ore replacing the water on the lake bed was some 3×10^{10} J. At 100% seismic efficiency, the M_L of the seismic waves produced would have been 3.8. No signals were detected at all.

Seismic efficiency for conversion of “potential energy” into radiated seismic energy is in reality very small indeed.

While the generally used seismic efficiency or coupling factor is in the range of 10^{-5} to 10^{-3} , a “good” coupling factor for say an explosive charge designed to maximise its seismic effect would be 10^{-2} to 10^{-3} .



1. http://www.seismosoc.org/publications/SRL/SRL_69/srl_69-5_eq.html

However, the coupling factor for explosions for instance on the surface¹ of the ground is much less, in the order of 10^{-5} to 10^{-6} .

This more pessimistic coupling factor for surface events would reduce the potential radiated seismic energy derived from the original *gph* of 10^{11} J to only 10^5 or 10^6 Joules, even before the creation of the dust and the pyroclastic flow is taken into account. In addition, the WTC was sat on top of a cavity which would reduce the coupling factor even further, below 10^{-5} or 10^{-6} .

Even nuclear weapons are marginal - only 0.5% of the energy of an underground nuclear explosion at best is radiated as seismic waves and frequently less.

Seismic Magnitude and TNT Equivalent

The seismic shocks from the WTC collapse measured $M_L 2.1$ to $M_L 2.3$ on the Richter Scale against seismic background levels that are essentially Zero. How much explosive energy was required to produce ground shaking of that magnitude?

The following amounts² of TNT are required to produce the equivalent Richter Magnitudes, assuming a good purposely high coupling factor - i.e. close contact between a buried explosive charge and the surrounding ground.

TABLE 7

| Richter Magnitude | TNT Weight | Description |
|-------------------|------------|----------------------------------|
| 1.0 | 30 pounds | large blast at construction site |
| 1.5 | 320 pounds | |
| 2.0 | 1 ton | Large Quarry or Mine Blast |
| 2.5 | 4.6 tons | |
| 3.0 | 29 tons | |

Therefore we can say that the nuclear explosions which blasted the Twin Towers at the beginning of their collapse were probably in the order of much more than 5 tonnes of TNT equivalent, because we already know from the 1993 truck bomb that the WTC site had very poor coupling between underground explosions and the surrounding strata.

1. www.seismo.com/msop/nnsop/03_source/source.html

2. www.seismo.unr.edu

If the explosion took place in an underground cavity, reducing the coupling factor, then much more explosive could be used but it would not produce a correspondingly higher seismic signature. This technique is used with some underground nuclear bomb tests. The bomb is exploded in the middle of an underground chamber to reduce the seismic wave intensity and therefore conceal the true size of the bomb.

The 7 basement levels under the WTC effectively formed such a cavity, which may explain why the 1993 truck bomb produced no detectable seismic signature. In addition, what hollowed out underground facilities existed further down?

We do not know what lay below level B6, the lowest official level, but the evidence indicates that at the very least there was a nuclear reactor and associated equipment. There might have been many other underground facilities as well, still there under Manhattan. Therefore the coupling of the nuclear explosion to the surrounding earth would not be very good and the blast would tend to follow the path of least resistance, up through the cavity of the underground basement levels and up into the tower. This is why we conclude that the power of the nuclear explosion must have been much more than 5 tonnes of TNT. This also explains why no body waves were detected by the seismographic stations, as in 1993. Instead of a spherically symmetrical radiation of seismic waves from the nuclear blast, most of the blast went up the “chimney” of the towers. We would need a computer simulation to model what the seismic wave pattern may have actually been.

This leads us to the inference that the nuclear explosion could have been equivalent to tens of tonnes of TNT, without producing an enormous seismographic spike of over 3.0 on the Richter Scale. But that amount of explosive would account for the volcanic nature of the WTC collapse, as the buildings erupted and disintegrated into an enormous pyroclastic cloud.

In his book on 911, Webster Tarpley describe how on the day after the WTC attacks, Danish explosives expert Bengt Lund was interviewed by a Danish newspaper¹ the *Berlingske Tidende*. Lund estimated that about one ton of explosives would have been required to bring down the towers.

We will see later how only 200lbs of explosive, when tightly coupled to the concrete structure of the building, was enough to demolish the remains of the Alfred P. Murrah Building in Oklahoma.

However, the amount of energy at work in the WTC collapse was far more than that required to just demolish them: it pulverised them. It was the world's first Nuclear Controlled Demolition.

1. 911 Synthetic Terror Made in USA, Webster Tarpley, Progressive Press 2005

Miscellaneous Points

Spike Amplitude

The highest amplitude of seismic waves detected occurred at the beginning of the seismic signature, arising from nowhere. This amplitude peak is 20 times as high as the rest of the seismic signature.

The energy in a wave is proportional to the square of the amplitude. Therefore, this peak pulse contained 400 times as much energy as the other energy pulses recorded.

Fall Characteristics

The buildings collapsed from the top down over a period of 8 to 10 seconds - they were in free fall and pulverised to dust.

But for a building falling like this, if a noticeable seismic wave was produced, we would see the seismic wave build up to a crescendo as more and more rubble hit the ground and then tail off over some period of time. We would not see the strongest impact right at the beginning and then see it fall off.

The conversion efficiency of mgh - that potential energy - is very inefficient, even if we had a controlled experiment set up in the laboratory dropping a steel block onto the bench to then measure the acoustic energy produced. Only an infinitesimal portion of that "potential" could be expected to be converted into seismic or acoustic waves.

It is not credible that the impact of the buildings falling on the ground could produce such enormous seismic spikes at the beginning that are 400 times as energetic as the other waves recorded.

The key point is - what energy source that lasted 5 to 6 seconds produced these two seismic pulses of local Richter magnitude M_L 2.1 and 2.3?

The seismograms recorded at Lamont-Doherty have exactly the same pattern as underground nuclear blasts.

4.6 Summary

We summarise here the key points:

1. The timescale of the impulsive event which produced the seismic waves was of the same order as an explosion, 5 to 6 seconds.
2. The seismogram itself is identical with that produced by an underground explosion and the timescale was similar.
3. The Surface Waves produced were High Frequency Waves, typical of an explosion and similar to those produced by a quarry blast or seismic surveying charge, not the Low Frequency Waves associated with an impact.
4. The source of the seismic energy was at or not far below the surface.
5. Collapsing rubble is an impact source that would produce Low Frequency Surface Waves, not the High Frequency Waves detected that are typical of an explosion.
6. Another explosion in the vicinity at a Newark petroleum depot did produce P and S Body Waves. But the 1993 explosion under the WTC did not produce any measurable P or S Body Waves. The collapse of the WTC on 9th September 2001 did not produce any measurable P or S Body Waves. This is consistent with the lack of P or S Body Waves in 1993 and we therefore have an explanation for why the Newark explosion did produce Body Waves but the WTC collapse explosions did not.
7. The towers had insufficient Potential Energy to produce seismic waves of the intensity detected.
8. The large spikes of M_L 2.3 and 2.1 are equivalent to at least 2 to 5 tonnes of TNT with good coupling and definitely much more at the WTC, maybe tens of tonnes of TNT, given the already known poor coupling of an explosion in the WTC basement cavity to the surrounding earth.
9. 5 other impulsive seismic events were measured by the observatory between 08:46 and 11:30. What was their source?

4.7 Conclusion

To conclude, the seismograms of the seismic waves produced by the WTC collapse are consistent with the hypothesis that they were produced by a nuclear explosion. By themselves, they show that a very large underground explosion took place.

The only seismic waves detected from the WTC on the 9th September 2001 were High Frequency Surface Waves. These can only be produced by an explosion.

It would not be possible to say whether that was a nuclear explosion without other evidence, but we can say it would have had to have had a TNT equivalence of at least 5 tonnes. Indeed, it must have been much more, due to the known poor coupling between explosions and the ground at the WTC site. The effect of this much TNT on a concrete structure would be to pulverise it into dust and gravel. This will be discussed in a later section.

4.8 Appendix: Extracts from Articles and Web Sites

Seismic Spikes

<http://uscrcrisis.lege.net/911/>

Seismographs at Columbia University's Lamont-Doherty Earth Observatory in Palisades, N.Y., 21 miles north of the WTC, recorded strange seismic activity on Sept. 11 that has still not been explained.

While the aircraft crashes caused minimal earth shaking, significant earthquakes with unusual spikes occurred at the beginning of each collapse.

The Palisades seismic data recorded a 2.1 magnitude earthquake during the 10-second collapse of the South Tower at 9:59:04 and a 2.3 quake during the 8-second collapse of the North Tower at 10:28:31.

However, the Palisades seismic record shows that-as the collapses began-a huge seismic "spike" marked the moment the greatest energy went into the ground. The strongest jolts were all registered at the **beginning** of the collapses, well before the falling debris struck the Earth.

These unexplained "spikes" in the seismic data lend credence to the theory that massive explosions at the base of the towers caused the collapses.

A "sharp spike of short duration" is how seismologist Thorne Lay of University of California at Santa Cruz told AFP an underground **nuclear explosion** appears on a seismograph.

The two unexplained spikes are more than 20 times the amplitude of the other seismic waves associated with the collapses and occurred in the East-West seismic recording as the buildings began to fall.

Experts cannot explain why the seismic waves peaked before the towers actually hit the ground.

Asked about these spikes, seismologist Arthur Lerner-Lam, director of Columbia University's Center for Hazards and Risk Research told AFP, "This is an element of current research and discussion. It is still being investigated."

Lerner-Lam told AFP that a 10-fold increase in wave amplitude indicates a 100-fold increase in energy released. These "short-period surface waves," reflect "the interaction between the ground and the building foundation," according to a report from Columbia Earth Institute.

(Therefore a 20 fold increase in amplitude means a 400 fold increase in the energy released).

"The seismic effects of the collapses are comparable to the explosions at a gasoline tank farm near Newark on Jan. 7, 1983," the Palisades Seismology Group reported on Sept. 14, 2001.

One of the seismologists, Won-Young Kim, told AFP that the Palisades seismographs register daily underground explosions from a quarry 20 miles away.

These blasts are caused by 80,000 pounds of ammonium nitrate and cause local earthquakes between Magnitude 1 and 2. Kim said the 1993 truck-bomb at the WTC did not register on the seismographs because it was "not coupled" to the ground.

"Only a small fraction of the energy from the collapsing towers was converted into ground motion," Lerner-Lam said. **"The ground shaking that resulted from the collapse of the towers was extremely small."**

Last November, Lerner-Lam said: "During the collapse, **most of the energy of the falling debris was absorbed by the towers and the neighbouring structures**, converting them into rubble and dust or causing other damage - but not causing significant ground shaking."

5

Residual Heat and Aerosol Information

5.1 Introduction

This chapter presents a variety of information from rescue and emergency services, eyewitnesses and scientific studies which give complementary information concerning what happened to the Twin Towers.

The most important piece of information in this category is the evidence that the WTC site and building rubble remained at an extremely high temperature for months after the collapse, with underground fires continuing to burn and pools of molten steel discovered weeks later under the rubble.

This is one of the main pieces of evidence which indicates that the blast was caused by the core meltdown of a nuclear reactor rather than an atomic bomb.

5.2 The Residual Heat of the Rubble

One of the most important pieces of evidence that the Twin Towers were subjected to the underground nuclear explosion of not just an atomic bomb but of a nuclear reactor is the elevated temperature of the rubble and the disaster site for months after the blast.

The following pieces of evidence are presented:

1. The infra-red thermal imaging carried out by the JPL/NASA AVIRIS system.
2. Eyewitness accounts of recovery work at the WTC site by a number of Health and Safety personnel from Bechtel.
3. The report by the DELTA and Kelly Group of the University of California at Davis.
4. Eyewitness accounts of molten steel by two construction companies involved in removing the rubble and debris from the site. A number of other accounts are now well documented on the Internet.

The AVIRIS Hot Spots

An infra-red thermal imaging survey of the WTC site was carried out by NASA at the request of the EPA on four separate days in the fortnight following the collapse of the Twin Towers.

Information on what was discovered is presented in the same USGS report¹ which presents the chemical analysis of the dust samples (see Chapter 3 of this report).

We have quoted below from the USGS report the procedure followed:

The Airborne Visible / Infrared Imaging Spectrometer (AVIRIS), a hyperspectral remote sensing instrument, was flown by JPL/NASA over the World Trade Centre (WTC) area on September 16, 18, 22, and 23, 2001

AVIRIS data collected on September 16, 2001, revealed a number of thermal hot spots in the region where the WTC buildings collapsed. Analysis of the data indicated temperatures greater than 800°F in these hot spots (some over 1300°F). Over 3 dozen hot spots of varying size and temperature were present in the core zone of the WTC. By September 23, most of these fires that were observable from an aircraft had been eliminated or reduced in intensity.

The AVIRIS instrument is a National Aeronautics and Space Administration (NASA) remote sensing instrument that measures upwelling spectral radiance in the visible through short-wavelength infrared. The instrument has 224 spectral channels (bands) with wavelengths from 0.37 to 2.5 microns (micrometers).

In response to requests from the EPA through the USGS, NASA flew AVIRIS on a de Havilland Twin Otter over lower Manhattan at mid-day on September 16 and 23, 2001. For these deployments, the Twin Otter was flown at altitudes of 6,500 and 12,500 feet. The spectral data for the maps shown here were measured at 6,500 feet and have a spatial resolution (pixel spacing) of approximately 6 feet (2 meters).

AVIRIS records the near-infrared signature of heat remotely. The accompanying maps are false colour images that show the core affected area around the World Trade Center. Initial analysis of these data revealed a number of thermal hot spots on September 16 in the region where the buildings collapsed 5 days earlier. Analysis of the data indicates temperatures greater than 800°F. Over 3 dozen hot spots appear in the core zone. By September 23, only 4, or possibly 5, hot spots are apparent, with temperatures cooler than those on September 16 (Thermal Figure 1).

1. "Environmental Studies....."
<http://greenwood.cr.usgs.gov/pub/open-file-reports/for-01-0429/index.html>

While the report says that 3 dozen hot spots were detected in the core zone of the WTC, the report presents the precise location of 8 of these hot spots. These locations are listed below.

TABLE 8 **HOT SPOT LOCATIONS**

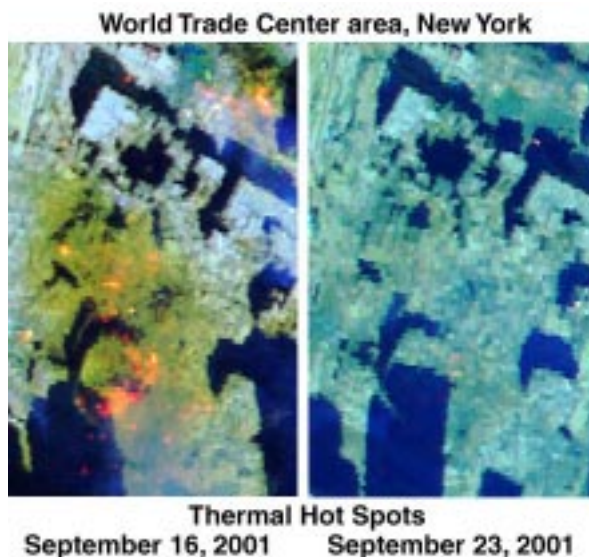
| Hot Spot | N Latitude | W Longitude | Kelvin |
|----------|----------------|----------------|--------|
| A | 40° 42' 47.18" | 74° 00' 41.43" | 1000 |
| B | 40° 42' 47.14" | 74° 00' 43.53" | 830 |
| C | 40° 42' 42.89" | 74° 00' 48.88" | 900 |
| D | 40° 42' 41.99" | 74° 00' 46.94" | 790 |
| E | 40° 42' 40.58" | 74° 00' 50.15" | 710 |
| F | 40° 42' 38.74" | 74° 00' 46.70" | 700 |
| G | 40° 42' 39.94" | 74° 00' 45.37" | 1020 |
| H | 40° 42' 38.60" | 74° 00' 43.51" | 820 |

These are surface temperatures. Two of the hot spots showed a surface temperature of 1000K or more, i.e. over 700°C.

If these were the surface temperatures, what was the temperature below the surface? And what heat source could produce such extreme temperatures?

One of the thermal images in the USGS report is shown below in Figure 45.

FIGURE 45



This again is only a thermal image of the surface, not the interior of the rubble.

Eyewitness Account by Bechtel

The following extracts are quoted from a web page¹ written by three Safety, Health and Emergency experts from Bechtel who at great personal risk assisted in the recovery efforts at the WTC.

The three men were Stewart Burkhammer, Norman Black and Jeffrey Vincoli.

Their testimony provides a very important insight into the extraordinary temperatures under the rubble of the towers.

“On Sept. 12, 2001, a small group of SH&E professionals from Bechtel Group Inc., led by Stewart Burkhammer, a professional member of ASSE’s National Capital Chapter, arrived in New York City to assist the city and state of New York in the emergency recovery effort after the terrorist attacks on the World Trade Center. The sights and experiences of the days and weeks that followed are described here in order to provide fellow SH&E professionals a brief account of the extraordinary challenges encountered at Ground Zero.”

*“Three underground floors had been used as a parking garage with a total capacity of 2,000 cars. Assuming (conservatively) the garage to be half-full, with the cars’ fuel tanks being anywhere from near empty to full, the explosive potential was extraordinary. With the stability of the debris pile unknown, **subsurface fires burning continuously**, welding and other hot work being performed on top of the debris.....*

*“WTC Building 6 housed several federal agencies, primarily U.S. Customs (Photo 11). The third floor, now largely inaccessible, contained a firing range. More than 1.2 million rounds of ammunition were stored on this level.... The ammunition was finally located on Oct. 24, 2001, **melted together** into large “bullet balls” that were extremely dangerous to handle and dispose of properly (Photo 12). At one point, a discharge of a bullet, due to the **immense heat** in the area, caused a shrapnel wound to the face of one worker. “*

The ammunition was not located until October 24th, 43 days after the collapse, yet the temperatures were still so high that they caused the discharge of a bullet.

*“The debris pile at Ground Zero was always **tremendously hot**. Thermal measurements taken by helicopter each day showed underground temperatures ranging from 400°F to more than **2,800°F**. **The surface was so hot that standing too long in one spot softened (and even melted) the soles of our safety shoes. Steel toes would often heat up and become intolerable.** This heat was also a concern for the search-and-rescue dogs used at the site. Many were not outfitted with protective booties (Photo 13). More than one suffered*

1. <http://www.asse.org/ps0502vincoli.pdf>

*serious injuries and at least three died while working at Ground Zero. **The underground fire burned for exactly 100 days** and was finally declared extinguished on Dec. 19, 2001.”*

The two photographs below from this web page show some of the melted bullets and the protective boots used on the feet of rescue dogs.

FIGURE 46

MELTED BULLET MASS & DOG WITH PROTECTIVE BOOTS



Therefore the underground fires burned for more than three months until December 19th.

The Bechtel people say that the helicopter measurements showed underground temperatures of more than 2800°F. However, any thermal imaging measurements taken from a helicopter would only indicate surface temperatures, not those deep below the ground. Therefore, this must have been an extrapolation or estimate of the underground temperatures. However, 2800°F is extraordinarily hot; it is over 1500°C and higher than the melting point of steel.

This testimony raises the obvious question: what intense heat source under the rubble could maintain underground temperatures of 1500°C for such a long period of time?

The Pools of Molten Steel

There were several eyewitness accounts of the discovery of pools of molten steel under the rubble when the debris pile was reduced and taken away.

What heat source could have melted structural steel and kept it molten for 6 weeks under the rubble of the Twin Towers?

The melting point of steel is approximately 1500°C.

The most well known account is that by Peter Tully and Marc Loizeaux in the American Free Press¹. According to both Peter Tully, President of Tully Construction and Marc Loizeaux, President of Controlled

1. See "N.Y. Air Hazards Found EPA Assurances Contradicted by UCD Scientists" on page 115.

Demolition Inc., who was called in by Tully Construction to help remove the rubble, pools of molten steel were discovered 6 weeks after the collapse of the towers.

In the AFP article, Tully says that he saw the pools. In a later communication to the Libertypost.org website, Mr. Loizeaux clarified¹ that he had not personally seen the molten steel but had been told about it by other contractors.

One of the most authoritative reports of the presence of molten steel that has been quoted was made by Dr. Keith Eaton, Chief Executive of the Institution of Structural Engineers.²

Based in London, the IoSE is the largest professional body dedicated to structural engineering in the world. In 2002, Dr. Eaton and colleague Prof. David Blockley visited New York and were given a guided tour of "Ground Zero". In the report which appeared in "The Structural Engineer", Dr. Eaton was quoted as saying:

*"They showed us many fascinating slides, ranging from **molten metal** which was still red hot weeks after the event, to 4-inch thick steel plates sheared and bent in the disaster".*

Other reports³ have also appeared stating that steel members had been literally evaporated by intense heat and there are several other reports of molten steel that are now extensively quoted on the Internet.

Therefore not only had a heat source melted 47 box columns each 4 inches thick at the bottom of the towers - it had maintained the steel in a molten state for over 6 weeks and presumably could have continued to do so if the rubble had not been removed.

This could not have been achieved by 10,000 gallons of kerosene, much of which was expended in the initial fireball outside the tower when the aircraft first impacted.

Energy Balance Calculation

To illustrate this, here is a simple calculation.

The central core of the WTC consisted of 47 rectangular steel box columns. These measured 36 by 90 centimetres and had a wall thickness of 10cms at the base, tapering to 6cms at the top (400 metres above).

1. See "Letter from Mr. Mark Loizeaux to Mr. Gary Bryan of the Libertypost.org Website" on page 119.

2. "New York Visit Reveals Extent of WTC Disaster", The Structural Engineer, Vol. 80, n17, P6-7, 3rd September 2002.

3. "Engineers Baffled over Collapse of 7 WTC; Steel Members have been partly Evaporated", New York Times, 29th November 2001. (Glanz).

There were also 236 smaller exterior steel columns which we will not consider.

The total volume of steel in the 47 central columns is calculated to be 3338.88 m³.

The density of steel is 7,874 kgm⁻³.

Therefore the mass of steel in the central columns is

$$3338.88 \times 7,874 = 26,290 \text{ tonnes.}$$

The Specific Heat Capacity of Steel is 470J/kg.K

Therefore the amount of thermal energy that would be required to raise this amount of steel to 800°C from room temperature to soften it so that it might lose structural rigidity (which is extremely unlikely in any event) would be

$$(800 - 25)^\circ\text{C} \times 470\text{J/kg}\cdot^\circ\text{C} \times 26,290,000\text{kg} = 9.6 \times 10^{12} \text{ J.}$$

The amount of thermal energy available from the 10,000 gallons of JetA in the B767 is calculated as follows:

The Heat of Combustion of JetA is 42.8 MJ/kg.

Jet A has a mass of 6.75 lb/USG or 3.07kg/USG.

The Total Thermal Energy available from the fuel is therefore:

$$(10,000 \times 3.07)\text{kg} \times 42.8 \text{ MJ} = 1.3 \times 10^{12}\text{J}$$

This is only 13% of the energy required to soften the steel of the central core columns, even assuming an impossible 100% efficiency of heat transfer from fuel to steel. In reality, the efficiency of transfer would be very low - a few percent at best.

As another indicator, the thermal energy in the fuel could melt a total of 1300 tonnes of steel if all of its thermal energy was transferred to the steel without losses. The steel would then immediately resolidify, lacking any further heat energy to maintain it in the molten state.

This is calculated as follows:

$$\text{Thermal Energy Available from Fuel} = 1.3 \times 10^{12}\text{J.}$$

Specific Heat Capacity of Steel is 470J/kg.K

Melting Point of Steel = 1538°C.

Latent Heat of Fusion of Steel = 277kJ/kg

Energy to raise 1kg of steel to melting point and then melt it is

$$(470 \times (1538 - 25) + 277,000) \text{ J} = 988.1 \text{ kJ}$$

Mass of steel that can be raised from room temperature (25°C) to 1538°C and then melted by $1.3 \times 10^{12} \text{ J}$ is

$$1.3 \times 10^{12} \text{ J} / 988.1 \times 10^3 \text{ J} = 1,315 \text{ tonnes.}$$

With a realistic conversion efficiency of only a fraction of a percent, it would be unlikely for even a few tonnes of the central steel support columns to have melted.

It is obvious that the official story that the steel supports of the towers were melted by burning jet fuel is woefully inadequate. Various internet sites have shown pictures of steel framed buildings that have not collapsed even after being subjected to intense fire for days. Fire has no effect whatsoever on the steel structure of buildings.

UC Davis - Broiled and Superheated Rubble

We will look at this in more detail in the next section. However, an aerosol and air quality monitoring program set up by the University of California at Davis monitored particulate emissions from the WTC site for a number of weeks after the collapse. The program was run by a world expert in atmospheric sciences, Professor Thomas Cahill.

A report on this monitoring appeared in a California newspaper¹. An extract from the article is as follows:

*The Sept. 11 collapse of the 110-story skyscrapers crushed concrete, glass, computers, electrical wiring, carpeting, furniture and everything else in the building, then burned and **broiled** the compressed, pulverized mass for weeks. In the **super-heated** rubble the material disintegrated into extremely small particles, which were released into the air for weeks. "It's like having a **large power plant** at ground level with no stack," Cahill said.*

In their press release² on what the study revealed, the UC Davis team comment:

*"There was also an unusual, very fine, silicon-containing aerosol. This latter type of aerosol can be produced only by **very high temperatures**, including **vaporisation of soil and glass**.*

The boiling point of silicon dioxide (glass) is about 2500°C. The underground temperature must therefore have been at least 2500°C to vaporise glass and soil.

1. Sacramento Bee 12/2/02 "N.Y. Air Hazards Found EPA Assurances Contradicted by UCD Scientists "

2. UCD Press Release 11/2/02

Caustic Dust

The web site www.cooperativeresearch.org has the following description of the USGS dust analysis exercise, as reported to the St. Louis Dispatch newspaper.

On the 17th September 2001, US Geological Survey (USGS) scientists Gregg Swayze and Todd Hoefen went to New York to obtain samples of dust fallout from the WTC collapse. They collected 35 dust samples from a variety of locations around Ground Zero. This was to complement an airborne spectrographic analysis being carried out by the AVIRIS system. Dr. Roger Clarke, the head of the AVIRIS systems, told the St. Louis Post-Dispatch, "The ground samples... gave us up-close, specific information on specific points." On September 19 they transmitted their data to the USGS office in Denver for analysis.

"Tests¹ revealed the dust to be extremely alkaline with a pH of 12.1 (out of 14). [St. Louis Post-Dispatch, 2/10/02] and that some of it was as caustic as liquid drain cleaner. [St. Louis Post-Dispatch, 2/10/02 (B)] "We were startled at the pH level we were finding" Swayze adds. "We knew that the cement dust was caustic, but we were getting pH readings of 12 and higher. It was obvious that precautions had to be taken to protect the workers and people returning to their homes from the dust." Sam Vance, an environmental scientist with the EPA, sends the results to officials at the EPA, the New York health department and US Public Health Service. [St. Louis Post-Dispatch, 2/10/02] "

What could have caused the dust to have such a high pH - i.e. be more caustic than drain cleaner?

It is not possible to measure the pH of a dry substance. The high pH readings the USGS obtained were actually measured by putting the dust in water first and then seeing how alkaline or acidic the solution became.

On the site, this moisture would come from the hands, skin and lungs of rescue workers - and the people of New York.

The fact that such high pH was measured means that the concrete dust either contained or had been turned into a strongly caustic or alkaline reagent by whatever it was subjected to when the towers collapsed.

How could this happen?

Dry cement powder is comprised of 64% Calcium Oxide (CaO). When this is added to water, it forms an alkaline solution of Calcium Hydroxide or Ca(OH)₂, similar to "drain cleaner" which is Sodium Hydroxide. In ready to mix cement and concrete, the Calcium Oxide is combined with

1. http://www.cooperativeresearch.org/timeline.jsp?timeline=environmental_impact_of_9/11_usgs_assessment

other oxides. When water is added, the CaO turns into Ca(OH)₂ which then in turn reacts with the other oxides present in the raw cement to form the inert finished mass of Calcium Silicate, Calcium Aluminium Silicate and similar substances which we call concrete.

Therefore pulverised concrete or cement dust is not in itself caustic but in fact very inert.

The only way the concrete dust could be made caustic would be for it to be subjected to intense heat of over 800°C.

The intense heat generated during the collapse of the WTC literally calcined the Calcium Silicate and Calcium Aluminosilicate of the concrete back into Calcium Oxide.

This analysis of the caustic nature of the dust by the USGS therefore confirms and corroborate the reports of the very high temperatures under the collapse site and on the surface itself.

We are told that the intense heat generated by the jet fuel fires melted the 47 steel box columns of the WTC and caused its total collapse.

Thermal calculations have already shown that this is impossible.

But the specific heat capacity of concrete is higher than steel. Even more thermal energy would be required to heat the concrete to calcine it into CaO than to melt the steel - and there was far more concrete in the buildings than there was steel.

Energy Comparison

How much energy would be required to heat the concrete dust of the WTC sufficiently to calcine it into CaO?

Concrete will decompose into carbon dioxide and CaO at between 1400 to 1600F or 760 to 870°C.

Let us assume that only half the concrete in each building was calcined, i.e about 50,000 tonnes.

The Specific Heat Capacity of concrete is 0.8kJ/kg.K

The thermal energy required to raise that mass of concrete to 760°C from room temperature is therefore

$$50,000 \times 1000 \times 0.8 \times (760-25) \text{ kJ} = 2.9 \times 10^{10} \text{ kJ or } 2.9 \times 10^{13} \text{ J.}$$

How much thermal energy is available from the fuel in a Boeing 767?

The maximum Fuel Capacity of a standard B767 is 16,700 US Gallons or 112,725 lbs (and we know the aircraft only had approximately 10,000 gallons on board at impact).

The Heat of Combustion of JetA is 42.8 MJ/kg.

The Total Thermal Energy available from the fuel is therefore:

$$(112,725/2.2)\text{kg} \times 42.8 \text{ MJ} = 2.2 \times 10^{12} \text{ J}$$

Therefore even assuming that the total theoretical thermal energy of the fuel was converted into heating up the concrete of the building, with 100% conversion efficiency, there would be insufficient energy available to calcine more than a small fraction of the concrete in the WTC.

In reality, much of the fuel from at least the second aircraft impact was expended in a large fireball outside the building. And the official explanation for the collapse is that the burning fuel melted the steel columns of each tower, which would not leave any energy left to render the concrete dust caustic.

According to the official FEMA report, the 767s carried much less than a full load of fuel, estimated in fact at 10,000 USG.

This amount of fuel could only raise 2,233 tonnes of concrete to 760°C from room temperature, even with a completely unrealistic 100% conversion efficiency.

Other Caustic Sources

There is another source of caustic agents that would have raised the pH of the dust: the radioactive oxides of Calcium, Barium, Strontium and Zinc produced by the nuclear fission and decay. These oxides all form an alkaline solution on contact with water. We have seen that the jet fuel could not possibly have calcined enough concrete to turn the dust caustic. The shock wave itself from the nuclear blast would not calcine the concrete either, but there were eyewitness accounts of the pyroclastic dust “sizzling” as it passed, so evidently it was at a high temperature - whether it was hot enough to have calcined the concrete we do not know.

However, even if we say that the intense volcanic heat was localised to the sub-basement levels under the tower, coming from the molten cores of the reactors, and that this heat had no effect on the majority of the dust from the disintegrating towers, the radioactive fallout itself in the dust would be caustic.

Therefore the caustic nature of the dust could be yet another indication that the towers were subjected to a nuclear explosion. We can certainly say we would expect to find caustic dust, caused by the presence of alkali forming oxides of the common nuclear fission products - Barium, Strontium, Zinc and also Calcium.

Conclusion

There is overwhelming evidence that extraordinarily high temperatures were produced during the collapse of the WTC and that they persisted

for weeks if not months after the collapse. If the towers had been demolished by an atomic bomb, the residual heat left would have been marginal. All of the fissile material in the bomb would be converted to explosive energy.

The thermal energy available from the fuel on board each aircraft is minuscule in comparison with that required to melt the steel columns and raise the temperature of the rubble to the temperatures of 1000K recorded by the AVIRIS infra-red system at the surface, let alone the underground temperatures that were vapourising glass.

The only explanation that can bring together both the evidence of nuclear fission and the volcanic temperatures on the site is that of the core meltdown of a nuclear reactor.

5.3 University of California at Davis Aerosol Analysis

The UC Davis DELTA Group (Detection and Evaluation of Long-range Transport of Aerosols) is a collaborative association of aerosol scientists at several universities and national laboratories in the United States. The DELTA Group has measured aerosols' emissions from the 1991 Gulf War oil fires, volcanic eruptions, global dust storms, and the Asian smogs.

The head of the DELTA Group is Professor Thomas Cahill, who due to his background in nuclear physics is an international expert in atmospheric sciences and the properties of aerosols.

From October 2nd 2001 till mid December 2001, a volunteer research team from the DELTA Group monitored the levels of atmospheric particles and aerosols in the atmosphere of New York, following the collapse of the WTC.

An automated particle collection system was set up on the roof of 201 Varick St., one mile north-northeast of the WTC site.

On February 11th 2002, Prof. Cahill gave a press conference to describe some of his findings. He made the following comments, quoted here from the UC Davis press release¹:

*"The air from Ground Zero was laden with extremely high amounts of **very small particles**, probably associated with **high temperatures** in the underground debris pile. Normally, in New York City and in most of the world, situations like this just don't exist."*

"Even on the worst air days in Beijing, downwind from coal-fired power plants, or in the Kuwaiti oil fires, we did not see these levels of

1. Reference here

very fine particulates". The amounts of **very fine particles**, particularly very fine silicon, decreased sharply during the month of October.

"The UC Davis DELTA Group's ability to measure and analyse particle size, composition and time continuously, day and night, is unequalled".

There were numerous events when bursts of wind lasting six to eight hours carried unprecedented amounts of very fine particles to the sampling site.

In the largest spike, the DELTA Group analysis found 58 micrograms per cubic meter of very fine particles in one 45-minute period -- "an extremely high peak," Cahill said.

Metals

Many different metals were found in the samples of very fine particles, and some were found at the **highest levels ever recorded in air in the United States**.

However, there are few established safety guidelines for airborne metals. One metal for which there is a guideline, lead, was present at low levels in fine and very fine particles.

Some of the metals for which there are no guidelines that were present in very fine particles in relatively high concentrations were iron, titanium (some associated with powdered concrete), vanadium and nickel (often associated with fuel-oil combustion), copper and zinc. Mercury was seen occasionally in fine particles but at low concentrations. Many of those metals are widely used in building construction, wiring and plumbing. Some are common in computers.

The metal content of the coarse particles is still being analysed.

What were these small very fine particles that Cahill was making such a point about? How could a metal aerosol be produced? Very high temperatures would be required indeed.

Very small particles are particularly dangerous since they can bypass the body's natural defence mechanisms and if breathed in, enter directly into the bloodstream. They can also pass through HEPA filters, the finest grade of gas mask available and they can even enter the body through the skin. So they are a serious hazard.

Anything with a diameter of less than 2.5µm is considered to be dangerous for these reasons. (A micrometer or µm is a millionth of a meter - or a thousandth of a millimetre).

The UC Davis press release further states:

“There are no established safe limits for inhaled very fine particles. The closest reference is the U.S. EPA “PM2.5” standard, which limits the allowable mass of airborne particles in the size range 2.5 micrometers to 0 micrometers. That standard is based on health studies of typical air samples, in which very fine particles are a small fraction of the total mass.

*In contrast, in the World Trade Center samples analysed at UC Davis, the **very fine particles** are a **large fraction** of the total mass.”*

So we can understand that Prof. Cahill would want to draw attention to the fine particulates for health and safety reasons. But is there anything more to it?

Thomas Cahill also explained the meaning of the generation of the particles to reporters more clearly.

“The presence of coarse particles immediately after days of rain indicated that they were being continually re-generated from a dry, hot source, not re-suspended from roadways and other surfaces.

“The very fine particles were high in a number of species generally associated with combustion of fuel oil - such as sulfur, vanadium, and nickel, and incineration of plastics and other organic matter.

*“There was also an unusual, very fine, silicon-containing aerosol. This latter type of aerosol can be produced only by **very high temperatures**, including **vaporisation of soil and glass**.*

“We had seen this previously, but at much lower concentrations, in the plumes of coal-fired power plants in the EPA BRAVO study in Texas, the burning oil fields of Kuwait, and Beijing during the winter coal heating season.

*“In the case of metals, we saw many different species in the very fine particles. Most, including lead and mercury, were at low concentrations at our site, but some, such as **vanadium**, were the **highest that we have seen recorded**”.*

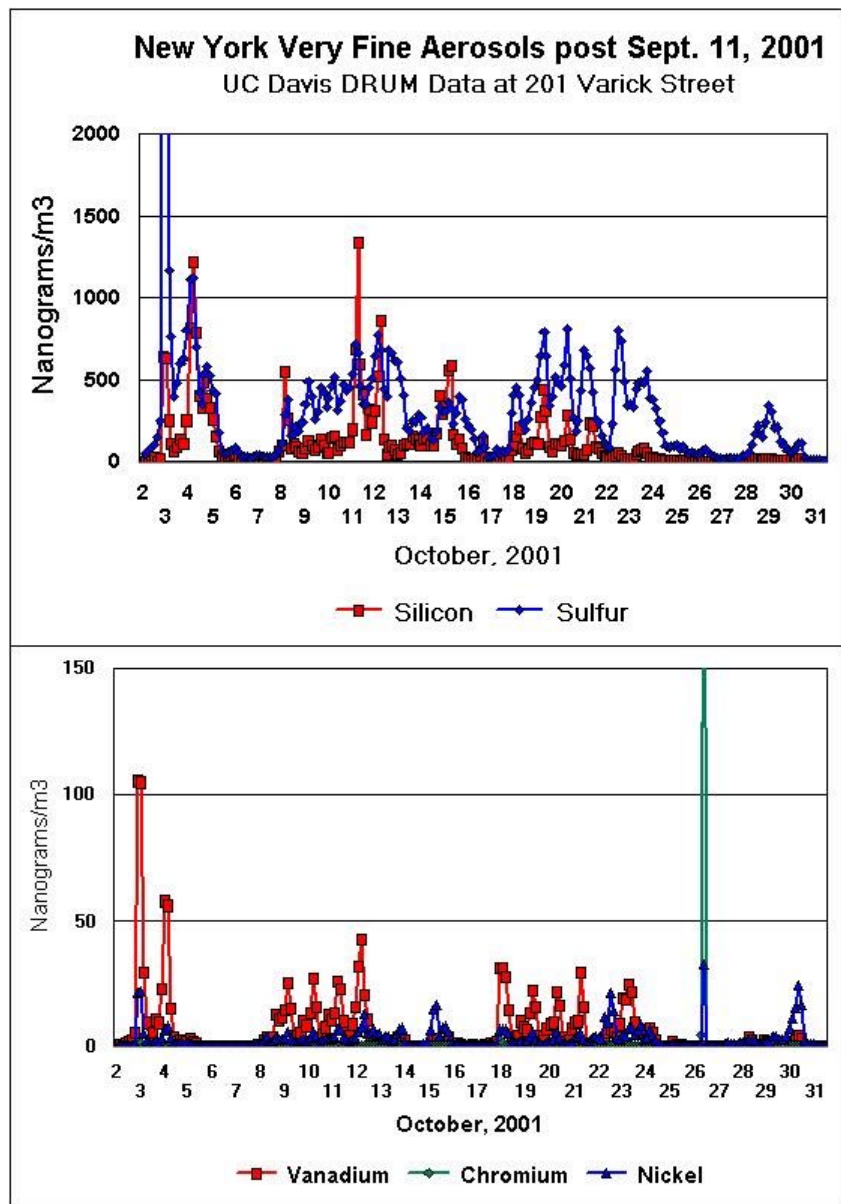
This is very important. Cahill was saying that the ground under Ground Zero was so hot that the soil itself was vaporised. Glass was not just being melted, but boiled away - and this was still happening weeks later. Even after rain had dampened down the site, these aerosols were being regenerated by the intense underground heat source.

The presence of Vanadium is very interesting. Cahill's comment about Vanadium and Nickel being associated with the combustion of fuel oil, plastics or organic matter is completely incorrect and draws attention to this incongruity. Where would this Vanadium have come from - the highest concentrations they had ever seen? Vanadium is not a common element and certainly not a common component of skyscrapers.

However, as we have already seen in Chapter 3, Vanadium is a decay product of radioactive fallout. It is associated with Nickel and Chromium in its decay series.

The graph below from Cahill's report shows that on the 3rd October, a high spike of Vanadium was detected, of roughly 110 ng/m³. On the next day, another Vanadium spike was detected, 60 ng/m³. On the 26th October there was a massive spike in the concentration of Chromium which goes off the scale (over 150 ng/m³) and to a lesser extent Nickel.

FIGURE 47



V, Cr and Ni are radioactive decay products from the same decay pathway.

It is interesting that on the 3rd and 4th October, the spikes in Vanadium concentration are accompanied by Silicon spikes, but on the 26th the enormous Chromium/ Nickel spike is not matched by the Silicon or Sulphur.

Whatever happened on the 26th October must have been a major event of some kind, to create this enormous Chromium emission without the normal building materials present.

We can speculate that on the 26th October 2001, perhaps the reactor core was exposed allowing high amounts of chromium and nickel into the atmosphere.

Stainless Steel

These spikes recorded by Cahill of chromium, nickel and to a lesser extent vanadium are also interesting from another point of view.

Surrounding the fissile core of a nuclear reactor is an enormous amount of stainless steel. The reactor pressure vessel itself is normally made of stainless steel 6 inches thick. All of the cooling pipes, heat exchangers and condensers carrying coolant water are made of stainless steel. The enormous steam turbines attached to the electricity generators are made of stainless steel.

As an example, the Indian Prototype Fast Breeder Reactor (PFBR) contains about 3300 tonnes of stainless steel in its core material and accessories, not including the steam turbines.

The main element alloyed with steel to create stainless steel is chromium. Normally, between 9% and 12% of SS is chromium. Other major alloying elements include nickel, vanadium, molybdenum and for specialist nuclear applications, titanium and zirconium. In fact, the single biggest industrial use of nickel is in the manufacture of stainless steel.

Given the extremely high temperatures that we know existed below the rubble, high enough to continually vaporise soil and glass, and the existence of molten pools of steel, it can be hypothesised that the enormous chromium and nickel spike on the 26th October may have been caused by the vaporisation of a pool of stainless steel, exposed by recovery operations on that day. If the temperature reached over 700°C at the surface, it would have been substantially higher below. We know that the underground temperatures were high enough to vaporise glass. The boiling point of Silicon Dioxide is 2230°C, which would be achievable underground if the surface temperatures were 700°C. The boiling point of steel is about 2800°C, which is about the same as the melting point of uranium or the temperature expected in the core melt of a nuclear reactor meltdown. Even if the molten steel was not boiling, it would still vaporise at the temperatures we know existed of

over 2000°C. The evidence that glass was being vaporised strongly supports the possibility that stainless steel, if it was present, was being vaporised.

The presence of these chromium and nickel spikes is consistent with the presence of a reservoir of molten or even boiling stainless steel. Stainless steel is not used as a construction material, certainly not as structural steel beams for a skyscraper. However, as we have said, thousands of tonnes of stainless steel are used in the core material of a nuclear reactor: a nuclear reactor is probably one of the few engineering applications where one will find so much stainless steel in one place.

To summarise, we know that a nuclear explosion occurred. The enormous residual and continuing heat is better explained by the core meltdown of a nuclear reactor, which reaches 2800°C or more. If there was a nuclear reactor present, one would expect to see evidence of a lot of stainless steel - at least hundreds of tonnes even for a small reactor. The detection of large quantities of chromium and nickel and to a lesser extent vanadium is consistent with the hypothesis that a large quantity of vaporised stainless steel was present and therefore is consistent with the deduction that the nuclear event was a core meltdown.

Diphenyl

An interesting observation is made in the New Scientist article below that of the 400 organic compounds detected after the collapse, many had never been detected in the air before.

One of these rare never before seen compounds detected by the EPA was diphenyl propane.

Where did the diphenyl come from?

Mixtures of diphenyl and diphenyl oxide have been used as the coolant for certain nuclear reactors - organic solvent cooled reactors. Diphenyl apparently never became as popular as water as a reactor coolant mainly due to the sensitivity of these solvents to radiation.

If diphenyl is so rare, that the EPA have never seen it as an air pollutant before, its presence *may* provide evidence that a diphenyl cooled nuclear reactor was under the towers.

5.4 Appendix: Extracts from Articles and Web Sites

This section presents some relevant articles with commentary on the aftermath of the WTC collapse.

<http://www.newscientist.com/news/print.jsp?id=ns99994160>

Health fears over Twin Towers' plume 18:34 11 September 03

NewScientist.com news service

Two years after the terrorist attacks on the World Trade Center in New York City, which claimed almost 3000 lives, researchers have gathered to assess the legacy of the giant plume of smoke and dust caused by the atrocity.

The composition of the plume was unique in its chemical composition and unprecedented in its complexity. As a result, no one yet knows the health effects of breathing them in and therefore how many more people may have been affected by the collapse of the Twin Towers.

*"This was a fully functional building that was completely smulched into a **burning pit**," says Thomas Cahill, an atmospheric physicist at the University of California Davis, who has focused on the composition of the finest particles in the plume for the past two years.*

*"That's never happened before, so we are in completely new territory. All we can say is we are worried about it," he says. "It may take years before these effects show up, **just like with radiation**."*

Astonishing complexity

The gathering on Wednesday at the American Chemical Society's meeting in New York City was the first time chemists, atmospheric physicists and doctors from over 20 US institutions had got together to pool their results.

*Paul Lioy, of the University of Medicine and Dentistry of New Jersey, emphasised to the meeting the sheer diversity of chemicals that were present in the dust. A mixture of plastics, computer hardware, synthetic furniture and hundreds of miles of wire burned to produce an aerosol of astonishing complexity. Out of 400 organic alkanes, pthalates and polyaromatic hydrocarbons he identified, **the majority had never before been detected** in the air, he says.*

One such compound, detected by researchers from the US Environmental Protection Agency, was diphenyl propane, thought to have come from burning plastic. The health consequences of breathing it are totally unknown, says EPA scientist Leonard Stockburger.

*Scientists from the US Geological Survey showed that even among the well-known molecules and crystals, new shapes of particle were thrown up by the plume. "They detected fibrous, **cylindrical materials**, which have a totally different behaviour to spherical particles," says Michael Hays of the EPA, who attended the meeting. "How does that influence inhalation routes?"*

But the scientists were careful to be clear about their message. "We don't want people to get the wrong impression. For long term effects, we are simply in an area of unknowns," says Lioy.

Next, the chemists' hope to produce a map of exactly what was in the air and when in the weeks and months after the September 11 attacks. Then, if people develop symptoms, the doctors will know exactly what they were likely to have inhaled.

*The New York City Department of Health launched a survey last Friday that will follow the health of up to **200,000 people** who were in the vicinity of the Twin Towers when they collapsed.*

*Some evidence of ongoing effects has already surfaced. A study published in August showed that pregnant women who were near Ground Zero on September 11 or up to three weeks later were **twice as likely to give birth to smaller babies** as women who were not.*

Note: reduced birth weight of neonates is a well known symptom of exposure to radiation.

N.Y. Air Hazards Found EPA Assurances Contradicted by UCD Scientists¹

*Cahill, 65, is a professor emeritus of physics and atmospheric sciences. He has used his background in **nuclear physics** to pioneer methods and tools for analyzing aerosols -- tiny particles suspended in the air -- and has led more than 40 studies on pollution around the world, including several in national parks and in the basins of Lake Tahoe and Mono Lake.*

The Ground Zero monitoring showed the fallout had subsided by late December, when Cahill's team stopped sampling. He said rain probably has cleared the air outside, but he is concerned about New Yorkers returning to contaminated buildings.

"These-size particles travel like a gas. They penetrate windows, doors, everywhere," he said. "You don't feel it, and you can't see it."

Cahill is whistleblowing here, with his comment that these gas-like aerosol particles "penetrate windows and doors" and that you cannot see it or feel it. Is this not an exact description of radiation? In fact, a gas could not pass through glass windows or through the structure of a door - the only thing that can penetrate in that way is radiation.

Cahill is hinting as strongly as he dare that the fallout is radioactive, to people who can decipher what he means. In the New Scientist article, he has also commented that the effects will be long term, "just like radiation".

There are some other revealing extracts in this article:

1. Sacramento Bee, 12/2/02, Eddie Lau and Charles Bowman

*The Sept. 11 collapse of the 110-story skyscrapers crushed concrete, glass, computers, electrical wiring, carpeting, furniture and everything else in the building, then burned and **broiled** the compressed, pulverized mass for weeks. In the **super-heated** rubble the material disintegrated into extremely small particles, which were released into the air for weeks. "It's like having a **large power plant at ground level with no stack**," Cahill said.*

Indeed, there was a large powerplant at ground level - an exposed nuclear reactor that had undergone core meltdown.

*By his (Cahill's) assessment, the **superheated** core of the building, buried under a giant pile of rubble with little to no oxygen, created a **pressure cooker** that **broiled** the concrete, glass, computers and everything else into infinitesimally small particles that were exuded in a gassy, lingering haze.*

The article goes on to quote Bruce Case, Former Head of the EPA's Centre for Environmental Epidemiology:

*"This was a unique event in many ways and one of those ways was the types of **human exposures** produced."*

The emphasis on asbestos turned out to be misplaced.

*Case predicted that the health fallout from the World Trade Center attack will continue indefinitely. "Regrettably," he said, "what we have here is **a human experiment on a grand scale**."*

Bruce Case is absolutely correct.

The experiment is to determine what are the long term effects on the human population when an enhanced radiation nuclear device is detonated in a major modern metropolis and the population carries on its activities as normal.

An interesting exercise in applied experimental biology, following in a long line of non-consensual clandestine nuclear experiments on civilians and the military that the US and UK have conducted since the 1940s.

New Seismic Data Refutes Official WTC Explanation

By Christopher Bollyn

Exclusive to American Free Press 9-5-2

<http://uscisis.lege.net/911/>

*Peter Tully, president of Tully Construction of Flushing, N.Y., told AFP that he saw pools of "**literally molten steel**" at the World Trade Center.*

Tully was contracted after the Sept. 11 tragedy to remove the debris from the site.

Tully called Mark Loizeaux, president of Controlled Demolition, Inc. (CDI) of Phoenix, Md., for consultation about removing the debris. CDI calls itself "the innovator and global leader in the controlled demolition and implosion of structures."

Loizeaux, who cleaned up the bombed Alfred P. Murrah Federal Building in Oklahoma City, arrived at the WTC site two days later and wrote the clean-up plan for the entire operation.

AFP asked Loizeaux about the report of molten steel on the site.

"Yes," he said, "**hot spots of molten steel in the basements.**"

These incredibly hot areas were found "at the bottoms of the elevator shafts of the main towers, down seven [basement] levels," Loizeaux said.

The molten steel was found "**three, four, and five weeks later**, when the rubble was being removed," Loizeaux said. He said **molten steel was also found at 7 WTC**, which collapsed mysteriously in the late afternoon.

Construction steel has an extremely high melting point of about 2,800 degrees Fahrenheit.

Asked what could have caused such extreme heat, Tully said, "Think of the jet fuel."

Loizeaux told AFP that the steel-melting fires were fuelled by "paper, carpet and other combustibles packed down the elevator shafts by the tower floors as they 'pancaked' into the basement."

However, some independent investigators dispute this claim, saying kerosene-based jet fuel, paper, or the other combustibles normally found in the towers, cannot generate the heat required to melt steel, especially in an oxygen-poor environment like a deep basement.

Eric Hufschmid, author of a book about the WTC collapse, *Painful Questions*, told AFP that due to the lack of oxygen, paper and other combustibles packed down at the bottom of elevator shafts would probably be "a smoky smouldering pile."

Experts disagree that jet-fuel or paper could generate such heat.

This is impossible, they say, because the maximum temperature that can be reached by hydrocarbons like jet-fuel burning in air is 1,520 degrees F. Because the WTC fires were fuel rich, as evidenced by the thick black smoke, it is argued that they did not reach this upper limit.

The hottest spots at the surface of the rubble, where abundant oxygen was available, were much cooler than the molten steel found in the basements.

Five days after the collapse, on Sept. 16, the National Aeronautics and Space Administration (NASA) used an Airborne Visible/Infrared Imaging Spectrometer (AVIRIS) to locate and measure the site's hot spots.

Dozens of hot spots were mapped, the hottest being in the east corner of the South Tower where a temperature of 1,377 degrees F was recorded.

This is, however, less than half as hot as the molten steel in the basement.

The foundations of the twin towers were 70 feet deep. At that level, 47 huge box columns, connected to the bedrock, supported the entire gravity load of the structures. The steel walls of these lower box columns were four inches thick.

Videos of the North Tower collapse show its communication mast falling first, indicating that the central support columns must have failed at the very beginning of the collapse. Loizeaux told AFP, "Everything went simultaneously."

"At 10:29 the entire top section of the North Tower had been severed from the base and began falling down," Hufschmid writes. "If the first event was the falling of a floor, how did that progress to the severing of hundreds of columns?"

Asked if the vertical support columns gave way before the connections between the floors and the columns, Ron Hamburger, a structural engineer with the FEMA assessment team said, "That's the \$64,000 question."

Loizeaux said, "If I were to bring the towers down, I would put explosives in the basement to get the weight of the building to help collapse the structure."

Letter from Mr. Mark Loizeaux to Mr. Gary Bryan of the Libertypost.org Website

Mr. Bryan:

*I didn't personally see molten steel at the World Trade Center site. It was reported to me by contractors we had been working with. **Molten steel** was encountered primarily during excavation of debris around the South Tower when large hydraulic excavators were digging trenches 2 to 4 meters deep into the compacted/burning debris pile. There are both video tape and still photos of the molten steel being "dipped" out by the buckets of excavators. I'm not sure where you can get a copy.*

Sorry I cannot provide personal confirmation.

Regards,

*Mark Loizeaux, President
CONTROLLED DEMOLITION, INC.*

New York Visit Reveals Extent of WTC Disaster

The Structural Engineer, Vol. 80, No. 17, P6-7, 3rd September 2002.

The Ground Zero site where the World Trade Center towers once stood was the focus of the visit by Prof. David Blockley and Dr. Keith Eaton to New York, on the first leg of their North American tour. They discussed developments on the site with Pablo Lopez and Andrew Pontecorvo of Mueser Rutledge.

Dr. Eaton said: 'We were given a fascinating insight into what had been happening at the site. Our hosts, under the firm's principal engineer George Tamaro (F), had been constantly involved at Ground Zero for several months. They had been called in as foundation engineers within a week of 11 September, and had spent several months examining the stability of the debris and the diaphragm wall all around the site, commonly known as the "bathtub" They had been key individuals in advising on the excavation of the site, with a great deal of care being needed before debris could be removed in order to maintain the stability of the original slurry walls.

'They showed us many fascinating slides' he continued, 'ranging from molten metal which was still red hot weeks after the event, to 4-inch thick steel plates sheared and bent in the disaster'.

How Strong Is The Evidence For A Controlled Demolition?

http://www.plaguepuppy.net/public_html/collapse%20update/#stills

“What is especially striking in the collapse of both towers is the enormous volume of material being ejected early in the collapse, and the quantity of shattered steel thrown out ahead of the dust clouds. Much of this broken steel consists of neatly chopped one-story long pieces of the perimeter columns, 14" square steel box columns that are assembled in three-story sections. These columns are also welded to 52" deep plates along each floor, but have somehow been broken free of these at the same time they are chopped up and ejected at high speed.”

<http://www.skfriends.com/images/biggart/07-wtc-Biggart1765.jpg>

FIGURE 48



“The above is one of an amazing series of pictures taken by Bill Biggart, a photographer who was killed by the dust cloud from the WTC-1 collapse. It shows large numbers of 12' sections of perimeter columns flying out ahead of the dust cloud in what is very clearly an explosive event. He got very close to the North Tower just before it fell, and captured some amazing pictures of its collapse and of the previous damage from the WTC-2 collapse. What is clear especially in Biggart's pictures is that the building is turning to dust as or even before it falls, as for example here. Because so much very fine powder is produced very quickly and mixed with air, it becomes a pyroclastic cloud, capable of very rapid and destructive flow after falling from its original height. This earlier article of mine (also referenced below) discusses the issue of pyroclastic flow as it applies to the WTC.”

6

The Blast Signature

6.1 Introduction

In this chapter, we compare photographs and the physical characteristics of the collapse of the WTC with photographs and the known physical characteristics of underground nuclear explosions.

We will see that they are very similar and that the pulverisation of the towers into fine dust and gravel is consistent with the effects of an underground nuclear explosion in the basement of the buildings.

This photograph (Figure 49) shows the very violent explosive nature of the WTC demolition. The building does not simply topple and collapse - it is torn to smithereens in a fountain of debris. Clearly, a very large source of energy is at work.

FIGURE 49

INITIAL BURST



This picture is of the famous Sedan underground nuclear test next to another photograph of the WTC.

FIGURE 50



SEDAN TEST



The Sedan Test shows the *main cloud* rising into the air while the *base surge* starts to roll across the ground. Material is ejected at high velocity in all directions.

We see the same pattern of high velocity ejecta jets firing vertically upwards in Figure 51 below, with the main cloud starting to rise above.

FIGURE 51

VOLCANIC ERUPTION OF THE WTC



One of the clearest photographs of all is the following.

FIGURE 52

VOLCANIC ERUPTION OF THE WTC II



This shows even more clearly the enormous explosion of energy directed vertically upwards into the air directly above the tower. The tower certainly does not just collapse from the bottom up, as the “melted columns” theory pretends. It does not even simply blow down from top to bottom from demolition charges. It does even more than that. It erupts vertically upwards like a volcano. There is only one explanation for what can be clearly seen in Figure 52. The immense pressure of an enormous explosive force that pulverised the tower and propelled it upwards like a volcano blowing its top.

This upward volcanic ejection combined with a downward pulverisation is consistent with an underground blast pressure wave travelling up the tower, hurling the top of the tower vertically upwards when it reaches the top and then pulverising the tower to dust as it is reflected and travels back down.

6.2 The Nuclear Blast Sequence

The following¹ sequence of pictures is very revealing. It shows both the characteristic effect of the initial underground nuclear blast and then the hot plume rising upwards after the blast, again typical of an underground nuclear blast.

FIGURE 53

NUCLEAR DEMOLITION SEQUENCE



In the first photograph, we see the *Initial Burst* of the nuclear explosion and then in the second photograph (Top Right) the *Main Cloud* starts to rise from WTC Nuclear Demolition. In the third shot (Bottom Left) we see the Main Cloud or *Plume* continuing to rise up into the atmosphere where it is caught by the horizontal wind. In the final photograph (Bottom Right) we see the pyroclastic *Base Surge* spreading out to left and right across the ground.

1. http://www.justiceforwoody.org/re911/materials/flyer/site1103_s2.jpg

Compare the WTC plume to the plume from a shallow underground nuclear burst.

A powerful source of heat can be seen at work in the WTC event, continuing to force dust up into the air in a pillar of rising smoke.

FIGURE 54

WTC PLUME vs NUCLEAR PLUME



Conclusion

It is plain to see from the most cursory inspection of the photographs of the WTC, that the collapse started with an extremely violent and high energy eruption of material from the building.

Figure 51 in particular shows that this ejection of material is comparable to a volcanic eruption.

The pyroclastic flow of dust after the collapse is also typical of certain volcanic eruptions.

The building did not simply collapse and implode as occurs during a controlled demolition. It certainly did not collapse as one would expect if the central supporting columns had simply buckled and given way.

The building in fact exploded violently and ejected pulverised concrete and rubble in all directions, followed by pyroclastic flow of hot dust following the same pattern as the base surge of an underground nuclear explosion.

Clearly, the energy source responsible for this was enormous and far greater than that required to carry out a conventional controlled demolition by implosion.

6.3 The Effects of an Underground Nuclear Explosion

The following descriptions of the effects of an underground nuclear blast is reproduced from an on-line book¹ called "The Effects of Nuclear Weapons", written by the US Dept. of Defense and the Energy Research and Development Administration in 1977. It is perhaps one of the best sources of information available on nuclear weapons. Particularly important points have been highlighted.

*2.91 When a nuclear weapon is exploded under the ground, a sphere of extremely hot, high-pressure gases, including vaporized weapon residues and rock, is formed. This is the equivalent of the fireball in an air or surface burst. The rapid expansion of the gas bubble initiates a **ground shock wave** which travels in all directions away from the burst point. When the upwardly directed shock (compression) wave reaches the earth's surface, it is reflected back as a rarefaction (or tension) wave. If the tension exceeds the tensile strength of the surface material, the upper layers of the **ground will spall**, i.e., split off into more-or-less horizontal layers. Then, as a result of the momentum imparted by the incident shock wave, these layers move upward at a speed which may be about **150 (or more) feet per second**.*

*2.92 When it is reflected back from the surface, the rarefaction wave travels into the ground toward the expanding gas sphere (or **cavity**) produced by the explosion. If the detonation is not at too great a depth, this wave may reach the top of the cavity while it is still growing. The resistance of the ground to the upward growth of the cavity is thus decreased and the cavity expands rapidly in the upward direction. The expanding gases and vapours can thus supply additional energy to the spalled layers, so that their upward motion is sustained for a time or even increased.*

*This effect is referred to as "**gas acceleration**."*

BASE SURGE AND MAIN CLOUD

*2.96 When the fallback from a shallow underground detonation descends to the ground, it entrains air and fine dust particles which are carried downward. The dust-laden air upon reaching the ground moves outward as a result of its momentum and density, thereby producing a **base surge**, similar to that observed in shallow underwater explosions. The base surge of dirt particles moves outward from the centre of the explosion and is subsequently carried downwind. Eventually the particles settle out and produce **radioactive contamination over a large area**, the extent of which depends upon the depth of burst, the nature of the soil, and the atmospheric conditions, as well as upon the energy yield of the explosion. A dry sandy terrain would be particularly conducive to base surge formation in an underground burst.*

1. <http://www.cddc.vt.edu/host/atomic/nukeffct/enw77b2.htm>

*2.97 Throwout crater formation is apparently always accompanied by a base surge. If gas acceleration occurs, however, a cloud consisting of particles of various sizes and the hot gases escaping from the explosion cavity generally also forms and rises to a **height of thousands of feet**. This is usually referred to as the "main cloud," to distinguish it from the base surge cloud. The latter surrounds the base of the main cloud and spreads out initially to a greater distance. The main cloud and base surge formed in the SEDAN test (100 kilotons yield, depth of burial 635 feet in alluvium containing 7 percent of water) are shown in the photograph in Fig. 2.97, taken six minutes after the explosion.*

There are some important points to note here.

First, when the compressive shock wave reaches the surface, it is reflected back. If the tensile forces exceed the tensile strength of the ground, it will spall - i.e. peel off in horizontal layers and in fact be pulverised, literally torn apart.

The Twin Towers can be considered to be essentially a finger of rock extending up into the air, integrally bound into the earth at the base by the concrete foundations. The shock waves generated by the nuclear blast would travel up the steel and concrete structure in much the same way as through the earth itself, with the effects of the blast seen at the top of the rock pillar or skyscraper instead of on a wide expanse of ground as in a normal nuclear test - for the simple reason that the bomb was exploded below the skyscraper.

We would therefore expect to see the reflected shock wave spall layers from the building or "artificial rock pillar" from the top as it travels back down to the bottom.

This is indeed exactly what was witnessed. The building vaporised from the top down at high speed. At 150 feet per second for the shock wave, this would take about 9 seconds to travel from top to bottom of the 1360 feet high towers. The towers fell in 8 seconds and 10 seconds respectively. Therefore, the speed of the collapse is in the right order of magnitude that would be expected if it was generated by an intense subterranean shock wave.

Secondly, a cavity is formed by the underground nuclear blast. We know that the WTC rubble fell into an enormous pit. The original space excavated for the foundations was of course filled in to a degree with concrete foundations and constructions, so where did this pit or cavity come from? The existence of this underground cavity is also indicative of a large underground explosion.

Thirdly, the descriptions and Sedan photographs of the Base Surge and Main Cloud from an underground nuclear blast correspond with what was seen at the WTC.

Pulverisation of the WTC

A very important piece of evidence is the eyewitness accounts by rescue workers that very little solid concrete rubble remained. An estimated 90,000 tonnes of concrete in each tower was literally pulverised into dust, sand or grit sized particles - an absolutely unprecedented event.

This indicates that the forces on the concrete were so high they exceeded its tensile strength and literally tore it apart.

The tensile strength of a material is simply the amount of force per unit area required to stretch it apart and break it. While concrete is quite strong in compression - in other words, one can "squash" it into itself with a very heavy load - it is very weak in tension, if one tries to pull it apart.

In the description of underground nuclear blasts above, it is described how if the forces produced by the shock wave generated by a nuclear blast exceed the tensile strength of the ground, the ground will literally be torn apart in horizontal layers as the wave travels through it.

Whatever could pulverise the concrete of the WTC into dust must have been a tensile force of enormous proportions - and a force that was applied throughout the whole building almost instantaneously, so that it could free fall without support from below to slow the fall.

Certainly, a nuclear blast detonated within the concrete foundations of the WTC would send a massive shock wave up the structure of the building and back down again at over 150 feet per second, pulverising it in its entirety almost immediately. As we saw above, the timescale matches with that observed for the collapse of the towers. (The figure of 150ft s^{-1} will vary depending on the type of ground strata, but in many ways concrete can be considered to be "artificial stone" or rock).

On July 30th 1995, Brigadier General (ret.) USAF Benton K. Partin published an analysis of the bomb damage to the Alfred P. Murrah Federal Building in Oklahoma, in which he proved that the building had been destroyed by a controlled demolition, not by a relatively weak ammonium nitrate truck bomb.

In his analysis¹, he makes the following observations (emphasis added):

"By contrast, heavily reinforced concrete structures can be destroyed effectively through detonation of explosives in contact with the reinforced concrete beams and columns. For example, the entire building remains in Oklahoma City were collapsed with 100-plus

1. "Bomb Damage Analysis of the Alfred P. Murrah Federal Building" July 30th 1995, Benton K. Partin, Brig. Gen. USAF (Ret.), <http://www.intellex.com/~rigs/page1/okc/report.htm>

relatively small charges inserted into drilled holes in the columns. The total weight of all charges was on the order of 200 pounds.

*“The detonation wave pressure (1,000,000 to 1,500,000 pounds per square inch) from a high detonation velocity contact explosive sweeps into the column as a wave of compressive deformation. Since the pressure in the wave of deformation far exceeds the yield strength of the concrete (about 3,500 pounds per square inch) by a factor of approximately 300, the **concrete is turned into granular sand and dust** until the wave dissipates to below the yield strength of the concrete. This leaves a relatively smooth but granular surface, with protruding, bare reinforcement rods, a distinctive signature of damage by contact explosives. The effect of the contact explosive on the reinforcement rods themselves can only be seen under microscopic metallurgical examination. (The rods are inertially confined during the explosion and survive basically intact because of their much higher yield strength and plasticity.)”*

Partin tells us therefore that a very small amount of high explosive is required to demolish a building if it is in contact with the concrete structure.

It is the compressive shock wave travelling through the concrete that destroys it, turning the concrete into granular sand and dust. In the case of the WTC, shaped cutting charges were also applied to the steel structure to cut it. Even though pre-stressed steel reinforcement rods are inserted into concrete to improve its tensile strength, these are useless when faced with a tensile or compressive shock wave of this magnitude.

Therefore, we can see how devastating the effects of a small nuclear blast of even a few tonnes TNT equivalence would be. No matter how imposing and invulnerable the structure of the WTC may look, the concrete would simply turn to dust under the impact of a shock wave that exceeds its yield strength by a factor of 300 or more.

We also know there was a shock wave of Richter Magnitude 2.3 from the impulsive spike recorded at the Palisades Earth Observatory, which is the equivalent of at least 2 to 5 tonnes (5,000lbs - 10,000lbs) of TNT.

Pyroclastic Flow

The USGS Report, eyewitness accounts and hundreds of photographs and videos show that as the towers collapsed, an enormous dust cloud rolled out over the ground in a pyroclastic flow.

Eyewitness accounts told of the hot dust racing down the streets, sizzling as it went, setting combustible material on fire.

This is exactly what one observes in the Base Surge from a shallow underground nuclear blast - a high speed surge of material, pulverised and vaporised by the atomic blast, spreading out at high speed in all

directions across the ground as a plume rises thousands of feet into the air.

6.4 Conclusion

The physical appearance of the WTC collapse is similar to and consistent with what one would expect from an underground nuclear explosion.

The same key physical markers are seen: a violent explosive initial burst, followed by a strongly upwardly rising plume or main cloud and a pyroclastic rapidly moving base surge across the ground.

The photographs of the initial burst are incontrovertible proof in themselves that an extremely violent explosion took place, far greater even than in a conventional implosion demolition. The energy analysis presented earlier shows that the energy required to turn the concrete into dust exceeded the gravitational potential energy of the buildings and the thermal energy of the fuel by many orders of magnitude. A nuclear explosion would certainly make up for that energy deficit.

6.5 Appendix: Extracts from Articles and Web Sites

Explosions in the Basement

http://www.plaguepuppy.net/public_html/underground/underground_explosions.htm

First-hand Accounts of Underground Explosions In The North Tower

This article from Chief Engineer magazine presents eyewitness account of the moments after the first plane crash, and describes evidence of large explosions in the lobby, parking garage and subbasement levels of WTC-1 at the time of the crash

It contains some fascinating first-hand accounts of the events of September 11 as recounted by operating engineers on the scene. One of the most remarkable is the story of Mike Pecoraro, who was working in the 6th sub-basement of the North Tower when the first plane hit. Here are some excerpts:

Stationary Engineer Mike Pecoraro

At about 6:45 he went to the mechanical shop in the second subbasement, ate his breakfast and chatted with his co-workers who were also arriving for the normal 8:00 a.m. beginning of their shift. Mike's assignment that day would be to continue constructing a gantry that would be used to pull the heads from the 2,500 ton chillers, located in the 6th sub-basement level of the tower. 49,000

tons of refrigeration equipment were located in the lower level of the tower. The 2,500 ton units were the smallest in use...

Deep below the tower, Mike Pecoraro was suddenly interrupted in his grinding task by a shake on his shoulder from his co-worker. "Did you see that?" he was asked. Mike told him that he had seen nothing. "You didn't see the lights flicker?", his co-worker asked again. "No," Mike responded, but he knew immediately that if the lights had flickered, it could spell trouble. A power surge or interruption could play havoc with the building's equipment. If all the pumps trip out or pulse meters trip, it could make for a very long day bringing the entire center's equipment back on-line.

Mike told his co-worker to call upstairs to their Assistant Chief Engineer and find out if everything was all right. His co-worker made the call and reported back to Mike that he was told that the Assistant Chief did not know what happened but that the whole building seemed to shake and there was a loud explosion. They had been told to stay where they were and "sit tight" until the Assistant Chief got back to them. By this time, however, the room they were working in began to fill with a white smoke. "We smelled kerosene," Mike recalled, "I was thinking maybe a car fire was upstairs", referring to the parking garage located below grade in the tower but above the deep space where they were working.

The two decided to ascend the stairs to the C level, to a small machine shop where Vito Deleo and David Williams were supposed to be working. When the two arrived at the C level, they found the machine shop gone.

"There was nothing there but rubble," Mike said. "We're talking about a 50 ton hydraulic press – gone!" The two began yelling for their co-workers, but there was no answer. They saw a perfect line of smoke streaming through the air. "You could stand here," he said, "and two inches over you couldn't breathe. We couldn't see through the smoke so we started screaming." But there was still no answer.

The two made their way to the parking garage, but found that it, too, was gone. "There were no walls, there was rubble on the floor, and you can't see anything" he said.

They decided to ascend two more levels to the building's lobby. As they ascended to the B Level, one floor above, they were astonished to see a steel and concrete fire door that weighed about 300 pounds, wrinkled up "like a piece of aluminium foil" and lying on the floor. "They got us again," Mike told his co-worker, referring to the terrorist attack at the center in 1993. Having been through that bombing, Mike recalled seeing similar things happen to the building's structure. He was convinced a bomb had gone off in the building.

Consider the implications of what Mr. Pecoraro describes: at this point the only overt damage to the building was the plane crash some 95

floors above, which could not have caused violent explosions underground.

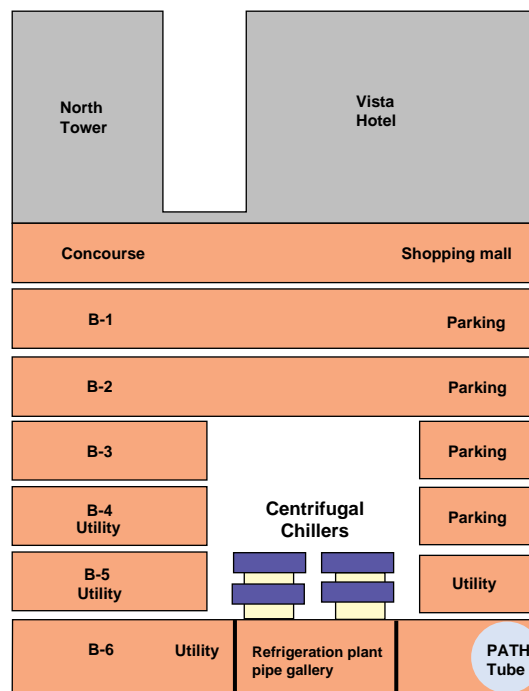
Since the towers were anchored at the base to the bedrock the shaking caused by the crash would have been greatest close to the crash site, getting progressively weaker as it approached the rigid attachment at the bottom.

Yet the underground damage he describes cannot have been the result of a mere shaking - nothing short of an explosion could reduce the contents of a machine shop to rubble. The Palisades Earth Observatory recorded M_L 0.9 and 0.7 spikes at 8:46 and 9:03 which are far too high to be accounted for by the aircraft crashes - given we know that a 0.5 tonne urea nitrate bomb in the WTC basement in 1993 produced no seismic signal at all at the Palisades. Given that, how could aircraft impacts 95 floors above register such high Richter magnitudes? These reports of underground explosions are corroborated by the seismic record. In fact, it's the other way round: the seismic record shows there was a very powerful explosion under each tower at the same time as each aircraft impact. Mike Pecoraro gives us an eyewitness account of what the seismic record has already proven.

The refrigeration plant actually consisted of 7 seven thousand ton centrifugal chillers to provide air conditioning to 10 million square feet of office space in the WTC complex, with an additional two 2,500 ton "piggy back" units. The chillers produced chilled water (from the Hudson River) to run the air conditioning. The 7 main units were located mid way between the two towers in sub level B5, a level 3 stories high.

FIGURE 55

WTC SUB BASEMENT LEVELS



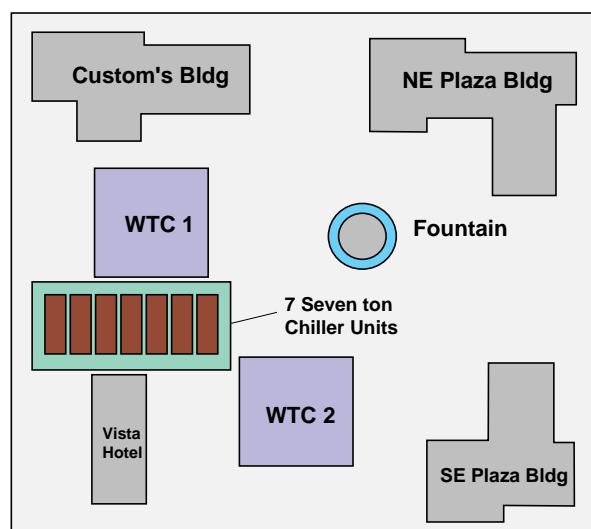
Apparently, the peak cooling load¹ of the WTC complex was 29,000 tons leaving 25,000 tons for “standby”. This seems rather high, particularly since air conditioning is only required in the summer. A separate auxiliary condenser water cooling system with a capacity of 3600 tons was used to supply year round air conditioning for the permanent loads such as mainframe computers etc.

Therefore, for half the year 54,000 tons of water chilling capacity was standing idle and during the summer, the peak load - not the continuous load - only used 54% of the system’s capacity.

It seems possible that this refrigeration plant had at least some spare capacity and would be ideally situated to provide chilled coolant water for the thermal Light Water Reactors beneath the WTC.

FIGURE 56

LOCATION OF HVAC REFRIGERATION UNITS



It seems that other office buildings in the USA use about 3000 tons of centrifugal chiller capacity² per 1 million square feet of office space, when using a small number of large capacity units rather than a large number of small capacity units. One modern installation (First Union Tower, Orlando) uses two 230 ton units for 292,000 square feet or the equivalent of only 2000 tons per million square feet. Very approximately, one would expect the WTC Complex with 10 million square feet to have about 30,000 tons of chiller capacity. This correlates with the peak load of 29,000 tons.

After the February 1993 attack, a temporary chiller installation of only 21,000 tons was designed and set up to cool the complex. This proved

1. “The WTC: One Year After the Bomb”, HPAC Engineering, February 1994
 Tonnage refers to cooling capacity, not the weight of the chiller units
 2. Case studies at www.trane.com

adequate. The full 49,000 tons of original equipment was then progressively repaired and put back into service.

Interestingly, the Pentagon, a very low rise building, uses an even higher amount of refrigeration relative to its 6.6 million square feet than the WTC; these may be old units - or is it cooling the extensive underground facilities which exist under the building?

Comments by Mark Loizeaux

In the 24th July 2004 edition of New Scientist appeared an interview with Mark Loizeaux, President of Controlled Demolition Inc. Mr. Loizeaux is one of the leading world experts in the art of demolishing buildings.

This is a very illuminating interview and I have quoted extracts from it here. Emphasis has been added.

Baltimore Blasters

New Scientist vol. 183 issue 2457 - 24 July 2004, page 48

<http://archive.newscientist.com/secure/article/article.jsp?rp=1&id=mg18324575.700>

How do you make a building dance down the street? Or walk sideways? It's the kind of control that only a master of blasting and demolition like Mark Loizeaux could pull off. He's head of Controlled Demolition Incorporated, the company known to everyone with something difficult to demolish. Since his father Jack set up the company, the family has brought down or blown up 7000 structures ranging from bridges to weapons, everywhere from the US to Argentina via Iraq. Liz Else talked to him within earshot of the rest of the family at CDI's headquarters deep in the peaceful countryside north of Baltimore.

Mark Loizeaux took a degree in business administration at the University of Tennessee, where he also studied architectural engineering. Apart from never having "done anything constructive in our entire history", the Loizeaux family set many world records, including imploding the largest single building (the J.L. Hudson department store in Detroit, 134 metres tall and 200,000 square metres). Other major blasts starred in movies such as Mars Attacks!, Lethal Weapon 3, Enemy of the State.

.....

Planned to the last millisecond?

*Completely planned. It has to be the right job in the first place, the right explosive, the right pattern of laying the charges, and sometimes, which sounds odd, **the right repairs to bring it down as we want**, so no one or no other structure is harmed. And by differentially*

controlling the velocity of failure in different parts of the structure, you can make it walk, you can make it spin, you can make it dance. We've taken it and moved it, then dropped it or moved it, twisted it and moved it down further - and then stopped it and moved it again. We've dropped structures 15 storeys, stopped them and then laid them sideways. We'll have structures start facing north and end up going to the north-west to avoid hitting something.

What sort of explosives do you use now?

*There are two types of explosive - low order and high order. Low makes a slow heaving explosion, which pushes more than it shatters. We tend to look for a shattering explosive because **we want to instantaneously remove the structural integrity of whatever we're working on**. So we would opt for nitroglycerin or NG-based dynamite. With a steel structure, we use something called a linear shaped charge that concentrates the force of a high explosive called RDX. For example, it took **80 pounds** of shaped charge to bring down two New York gas tanks built with **5 million pounds of steel**.*

Few people would be able to do that kind of reckoning, they'd rely on computers...

This is where I truly struggle and it may have something to do with bad synapses or something, I don't know what it is, but I really have a problem with it. I like computers. I think CAD [computer-aided design] has revolutionised construction and safety of structures worldwide for people in differing environments and circumstances. But CAD is used for putting things together where you specify the steel, the concrete, you assume construction methods within parameters of building codes. You assume it was put in using health and safety-approved methods and inspections. It does not allow for weathering, structural fatigue, modification, all the things that don't show up on blueprints.

Is demolition too different a world?

Yes. You move into a different category of structure that is distressed - failed yet standing structures that have failed as functioning structures because they break building codes or have been burnt, struck by lightning or tragically these days bombed or hit by planes. And it frightens me that would-be advancers of the demolition arts think that they can take a program - which is entirely contingent on the data put into it - to analyse what is going to happen in a structural system which is beyond definition. It can be bracketed, it cannot be defined. When you design a building you can specify each and every variable, but that is not the case in structures that have endured a life.

You sound like you develop a sort of sixth sense for the job?

I think that's possibly true. Obviously a lot of it is technical and based on evidence - like picking the job by looking at photographs, talking to people, going there and so on. But even then, there is a feeling and

some of them are not right for a number of reasons you can't always articulate - including **customers who don't seem right**.

Were you involved with the 9/11 clean-up?

Our crews worked with one of the main contractors after 9/11, to pull the shards of skin of the building from the south tower of the World Trade Center, out of this 15 storey gash in the side of the Deutsche Bank building.

When you watched 9/11, did you imagine that the towers would come down like that?

I did a report on the World Trade Center when I was at college and I knew exactly how it was built. I understood the concept. **When I saw the first plane hit**, my mind first went to: "Oh my god, what's happened? Is it a plane, **a private plane**?" But I was watching along with most of the western world when the second plane hit. And everything changed. When I saw what hit, that it was an airliner, that it was loaded with jet fuel, I remembered the long clear span configuration from the central core to the outer skin of the World Trade Center from the report I did. And we had just taken down two 40-storey structures in New York.....

I still had some cellphone numbers so when the second plane hit I said: "Start calling all the cellphones, tell them that the building is going to come down." It was frenetic, nobody could get through even with speed dialling. And I just sat there, just sat there. Of course, building number 7, which is where the emergency management headquarters was, was on fire. I'd been in that office two months before. And I sat there watching, I picked up the phone and I called a couple of people on the National Research Council Committee involved in assessing the impact of **explosives**. They said: "What do you think this is, that they're going to fail, they're both going to fail?" The expression around was they're going to pancake down, almost vertically. And they did. It was the only way they could fail. It was inevitable. And it was horrific.

Could they have been built in such a way that they would have withstood the impact?

Bad question - they did withstand the impact. The correct question is could they have been built to withstand the consequences, the fire?

Well - could they?

I'll defer to the reports coming out, but I will say - is society willing to pay for it? It's far cheaper to take the battle to terrorists than let them bring it to us.

.....

Are you mostly successful in that?

*We have an enviable record. No one has been killed as a result of our explosives demolition operations - though we have had to stop people hiding in dangerous places to get good pictures - one even **disguised himself as a bush.***

.....

Yet you've worked in many environments?

*Oh yes. Right now we are working at a **nuclear plant** in Maine, and one in Massachusetts, and getting ready to start one in Connecticut. We're working on nuclear facilities in Colorado Springs, and at Hanford in Washington State.*

Some comments and questions:

1. Someone disguised himself "as a bush"? Not in a bush or behind a bush but as a bush!
2. What are the co-incidental chances of Mr. Loizeaux of Controlled Demolition Inc. being one of the very few people in the world who saw the first plane hit? And he thought it was a private plane - a small aircraft? Who asked Mr. Loizeaux to be in that place that day?
3. He had been in the Emergency Management Centre in Building 7 two months earlier. Doing what? Planning for what emergency? At whose instigation and request?
4. Why did he start calling people on the NRC who assess the impact of explosives after the second plane hit? Surely he would want to talk to people who deal with kerosene fires, aircraft crashes etc.
5. What does he mean by "customers who don't seem right"? How could you get such a customer in his business - insurance fraudsters? People who want to pick his brains on how to demolish a building? Clearly, it is such a black art demolishing a building that it absolutely requires someone with experience - it cannot be planned analytically.
6. "The right repairs to bring it down as we want". There have been reports that work was being carried out on the Twin Towers in the weeks before the collapse, including ostensible "repair work". Some of the central elevators were apparently always out of commission during the preceding weeks. Was this actually preparation to demolish the towers? Mr. Loizeaux says he was intimately familiar with the building. Were his brains tapped to find out how to do it, pretending it was to protect against a terrorist attack?
7. Only 80 pounds of RDX shaped charge could bring down a structure containing 5 million pounds of steel. So, as also confirmed by Brigadier General Partin on the controlled demolition of the Alfred P. Murrah Building, only a very small amount of explosive is needed to demolish these steel frame buildings.
8. Mr. Loizeaux uncharacteristically dodges the question about whether the WTC should have withstood the fire - and in mid-2004, 3 years later, what "reports coming out" is he referring to? There have in fact been no thorough and candid engineering analyses carried out into how

the buildings collapsed - only the fairy tale put out that the jet fuel melted the 47 central steel columns.

9. Mr. Loizeaux comments that "We want to instantaneously remove the structural integrity of whatever we're working on." To use the weight of the building to help bring it down. This is what occurred with the WTC.

Conclusion

Therefore Mr. Loizeaux makes a number of interesting comments about the WTC and the controlled demolition of buildings in general. My view is that he is in fact whistleblowing, to give people in what has become known as the "911 Research Community" some useful hints and pointers.

From what he says, it is clear that anyone intent on carrying out an illegal or clandestine controlled demolition of a building would require the advice of an expert on how to do it. The best way to obtain that advice would be under a pretext of some sort, such as security planning. The WTC had already been bombed twice unsuccessfully. Therefore to ask CDI for their advice on the consequences of another bomb attack and how a "terrorist" would have to do it to be successful, so that security could be put in place against it, would seem like a sensible precaution. They might ask CDI where charges would need to be placed, so that security cameras could be installed to cover those locations. This was already a bomb damaged building, so again it would be necessary to approach an expert and it would seem sensible to CDI to ask for their expert advice.

Indeed, one feature that had been remarked upon is just how small many of the pieces of the steel beams were. They had been cut into 18" long sections by cutting charges. This seems like overkill. It lends support to the idea that the demolition was not in fact carried out by experts but in order to make absolutely sure of the job, excess use was made of cutting charges by less experienced people.

7

The China Syndrome

“If the radiance of a thousand suns

“Were to burst at once into the sky

“That would be like the splendour of the Mighty One

“I am become Shiva

“The Destroyer of Worlds”.

The words spoken by Robert Oppenheimer after the Trinity Test, the first atomic bomb of the modern age. Alamogordo, New Mexico, 5:29:45, 16th July 1945: Ground Zero of the Manhattan Project.

7.1 Introduction

What type of nuclear devices could have been used to individually demolish the two WTC towers, and perhaps Building No 7 without destroying half of New York at the same time?

Our initial assumption was that the device must have been a “micro-nuke” or more technically a Small Atomic Demolition Munition (SADM).

However, it appears that in fact the Twin Towers were brought down by the deliberate explosion of a clandestine nuclear reactor installed under each building. This was associated with a core meltdown - the China Syndrome.

It is interesting to note that the church at the WTC was called Trinity Church.

The program to develop the atomic bomb was of course called the Manhattan Project. One of the main project planning and control offices was located in Manhattan. The name of the first atomic bomb test itself was Operation Trinity.

Did the original or a later Manhattan Project involve the installation of nuclear reactors under Manhattan?

7.2 The SADM

In the 1960s, US Marines and Special Forces were training to use Small Atomic Demolition Munitions (SADMs) to sabotage enemy installations. In one scenario, an operative would jump out of a helicopter some distance off-shore, with a SADM attached to a flotation device. Once in the water, the operative would swim or row a dinghy towards the shore based target such as an enemy port, dockyard, naval installation etc. The SADM would then be left in the harbour or nearby on a timed fuse.

A Nuclear Artillery Shell called “the Davy Crockett” was also deployed by the US Army in the 1960s and 70s. The shell weighed 76lbs and had a low yield of about 10 tonnes of TNT equivalent.

The latest SADMs built by the Russians in the 1990s were known to have a yield of below 10 tonnes - ideal for destroying a very large building or a city block.

The seismic interpretation by the Palisades Earth Observatory estimates the magnitude of the short impulsive seismic event just before each tower collapsed at Richter Magnitude 2.3. With good coupling between the explosion and the ground, the TNT equivalent of the blast would be between 2 and 5 tonnes. We know that the coupling is in fact poor, so the actual explosive power was higher - maybe 10 to 20 tonnes.

These estimates are well within the range of possibility for either older generation nuclear demolition munitions or the latest generation of modern “micro nuke”, or SADM, which have been under development since the beginning of the 1990s.

The photographs below show a MADM - Medium Atomic Demolition Muniton from the 1950s or 1960s and a backpack portable SADM.

FIGURE 57

MADM AND SADM



One can see that the devices are certainly small enough to be installed without too much difficulty in the basement of a building if required.

There is a certain ironic twist to the fact that SADM sounds like "Saddam".

However, as we have discussed earlier, if the Twin Towers had been brought down by a purpose designed nuclear weapon - a small atomic bomb - there would have been no residual heat left persisting for months after the blast. In addition, the sheer quantity of fallout produced points towards a much larger source of fissile material than would be found in a small atomic bomb, which would contain less than 10kg to 20kg of uranium or plutonium.

7.3 Evidence for a Core Meltdown

What factors lead us to the conclusion that the nuclear device which destroyed the Twin Towers was a nuclear reactor rather than an atomic bomb?

This section presents and discusses the main indicators.

The WTC Light Memorial

When a nuclear fission chain reaction occurs, a very distinctive signature is produced which shows that an extra-ordinary chemical reaction is underway.

That signature is the emission of an intense blue light, known as Cerenkov Radiation.

This is an extremely intense and dangerous radiation, though also eerily beautiful.

A well known example of Cerenkov Radiation occurs when cosmic rays enter the atmosphere from outer space. Travelling at high speed, the cosmic rays can exceed the local speed of light in the atmosphere itself. If radiation travelling in a medium (air, water, glass for instance) exceeds the speed of light in that medium, then this blue Cerenkov light is emitted.

Cerenkov Radiation is therefore a signature of highly energetic intense radiation.

When the Chernobyl nuclear power plant exploded in 1986, causing a core meltdown, the lid of the reactor weighing 2000 tonnes was blown clean off. The reactor core was exposed. An interview with the eyewitness Alexander Yuvchenko was published by New Scientist on the 21st August 2004, a month after the interview with Mark Loizeaux.

Yuvchenko described the sight when he went outside to try and obtain a clearer idea of what had happened to reactor number 4:

“From where I stood, I could see a huge beam of projected light flooding up into infinity from the reactor. It was like a laser light, caused by the ionisation of the air. It was light-bluish and it was very beautiful. I watched it for several seconds. If I’d stood there for just a few minutes I would probably have died on the spot...”

Yuvchenko then went up to the reactor hall with three other workers.

“What happened when you got back to the reactor hall?”

“We climbed up to a ledge. I stayed behind propping up the door. I stood there listening to their reaction to what they saw, which looked like a volcano crater...”

It is important to remember that the Chernobyl disaster happened in the middle of the night, so the blue light was clearly visible streaming up into the night sky.

Several months after the WTC collapse, an event occurred which lends circumstantial support to the other indications that the nuclear explosion was caused by an induced runaway chain reaction and core meltdown.

In early 2002, a Light Memorial was set up to “commemorate” the Twin Towers. Two banks of 44 halogen spotlights were set up at the WTC site, to project an intense beam of light into the sky where the towers used to stand. The lights were only switched on from dusk till 11pm each night between the 11th March and the 13th April 2002. This would have been after the main clear up operation and perhaps when the concrete covering was being placed over the site.

The colour of the two beams of this Light Memorial was blue.

FIGURE 58

WTC LIGHT MEMORIAL



This certainly matches Yuvchenko's description of the Chernobyl reactor core: a huge beam of projected light blue light flooding up into infinity.

Is this really just a co-incidence?

FIGURE 59



It is possible that by Spring 2002, as the last clearance work was being undertaken and the site was being rather strangely covered with concrete, that the reactor cores were exposed to the atmosphere for at least some of the time. In order to cover up the intense blue light that would otherwise attract attention - and advertise what lay beneath the rubble - these two light projectors were set up with the cover story of being a "Light Memorial" for a period of one month. They were used to shine up into the sky in the same place as the Cerenkov Radiation being emitted by the reactor cores to mask them or at least provide a cover story to explain them.

Why was the light memorial switched on for only a few hours, from dusk until 11pm?

Perhaps for security reasons work was only started on the exposed reactors at dusk to prevent people in the buildings overlooking the site from seeing what was happening. Most of the office workers would have gone home by that time as well. Work would also have had to be of limited duration to limit the radiation exposure to the personnel working on the final stage of the operation and to limit radiation escapes that might be picked up by people with Geiger counters in the vicinity.

It is also possible that if work was carried out during the day on the exposed reactor cores, the Cerenkov Radiation would be much less visible and maybe invisible. The light projectors may have only been needed at dusk to camouflage the Cerenkov emissions.

Residual Heat and Molten Steel

As we have seen, one of the main indicators that the nuclear explosions that destroyed the Twin Towers and possibly Building No 7 came from the runaway chain reaction of a nuclear reactor, rather than an atomic bomb, is the intense heat which persisted for weeks and months under the rubble.

An atomic bomb would simply explode, with all its material fissioning and that would be that. There would be no residual heat source left that would continue to vaporise glass and concrete for weeks afterwards.

If the core of an operating nuclear reactor is not cooled sufficiently, for whatever reason, it will melt, reaching a temperature of over 2,700°C. The heat to do this is generated by the natural radioactive decay of the nuclear fuel in the core - that is without even having to remove the moderator control rods that control the rate of the fission chain reaction. Even if the reactor is shut down - i.e the fission chain reaction is stopped - heat generated by the continued radioactive decay will melt the core if the cooling system is not kept operating.

A core meltdown would leave indeed a large pool of molten steel (and other materials), from the hundreds or thousands of tonnes of stainless steel pressure vessel and associated equipment that surround the core. In the so-called China Syndrome, the molten nuclear fuel, molten steel and other material literally melt their way through the concrete bioshield of the reactor and then the underlying bedrock until eventually it runs out of thermal energy.

It was originally suggested that the core would head towards China if it kept on going, from which came the name "The China Syndrome".

The pools of molten steel, still present 5 weeks after the collapse, are very strong evidence that indeed a core meltdown is what occurred, fuelling the intense heat production for 5 or 6 weeks and longer. A core melt temperature of 2,700 - 3,000°C would certainly account for the volcanic temperatures encountered at the site, the vaporisation of glass and soil, the emission of a chromium and nickel aerosol and the presence of molten steel so long after the event.

Alexander Yuvchenko's description of the reactor core as a "volcano crater" vividly describes this scenario.

Quantity of Fallout

The other indication that the device was a reactor is the sheer quantity of fallout. Different estimates are available for the mass of the towers and how much of that mass was steel as opposed to concrete. But we can say conservatively that at least 100,000 tonnes of structural concrete from each of the two towers was pulverised into dust by the explosions.

With a minimum of 600ppm of Strontium and 1000ppm by weight of Zinc present in the dust, that amount of dust translates into approximately 60 and 100 tonnes of strontium and zinc respectively per tower. This is an absolutely astronomical amount. If we generously assume that as much as a third of the Uranium originally present transmuted into Strontium, this would put the original mass of Uranium present at about 470 tonnes *per tower*. This is a staggering amount. If a lower proportion of the Uranium in the reactors fissioned into Strontium, then even more Uranium would have had to be present.

Earlier, when discussing the presence of 1000ppm of Zinc on page 66, we estimated that at least 700 tonnes of Uranium might originally have been present, at a conservative estimate - probably double that.

How much Uranium is there in a nuclear reactor?

This of course varies depending on the size and power of the reactor.

Taking again the example of the Indian Prototype Fast Breeder Reactor¹, this contains 1758 fuel subassemblies in the core; each subassembly is made up of 217 tubes or fuel pins with an outside diameter of 6.6mm, an internal diameter of 5.7mm and a length of 2.7m. This gives a volume of $6.9 \times 10^{-5} \text{ m}^3$ per pin and a total fuel volume of 26.3 m^3 in the core. The fuel used is normally an 80% - 20% mixture of Uranium Oxide and Plutonium Oxide but enriched Uranium was used on earlier FBR reactors. Let's assume we use a pure Uranium fuel, which means we are exaggerating the amount of Uranium present in an FBR, but on the other hand FBRs (of which there are only a handful in operation) have a smaller core than a conventional thermal reactor - so this estimate will actually be lower than what we would expect in a conventional thermal reactor.

Uranium has a density of $18,950 \text{ kg m}^{-3}$. Therefore with a volume of 26.3 m^3 of fuel, this makes nearly 500 tonnes of uranium present in the core.

Our estimates may not be so wide of the mark. Our 700 tonne estimate was conservative - it may have been more than double that. In fact, our estimates tend to strongly support the view that there were indeed two nuclear reactors, one under each tower, which accounted for the two strong seismic signals and nuclear blast signatures. The amount of fallout is consistent with the presence of two reactors, not one.

For another example, we consider the small Magnox nuclear reactor first built at Calder Hall in the UK, which went live in 1956. This contained 10,200 fuel elements, each a rod of Uranium one metre long with a diameter of 25mm. The total volume of Uranium was therefore 5 m^3 and the total weight of Uranium fuel in the core was 95 tonnes.

1. "Development of Fuels and Structural Materials for FBRs" Sadhana vol 27 part 5, October 2002, p527 - 558, Indira Gandhi Centre for Atomic Research

This was a small reactor by modern standards but still contains over 1000 times as much Uranium as would be found in a small atomic bomb.

The reactors under the WTC would most likely be of the conventional thermal or Light Water type which use metallic enriched Uranium fuel, not uranium oxide.

The quantity of fallout that was measured in the WTC dust is so great that it provides overwhelming evidence that only a reactor could be the source.

The Explosive Power of a Critical Reactor

One may wonder why a nuclear reactor containing tens if not hundreds of tonnes of fissile material did not destroy all of New York if it went critical and entered a runaway chain reaction.

The answer is that the fissile material in an atomic bomb is compressed and contained into a small volume. The energy is concentrated and all of the fissile material fissions at once to create a large explosion.

The runaway chain reaction in a reactor is less constrained. A reactor is designed in the first place not to explode. If it does go supercritical, the explosion that is produced will probably not involve all the fissile material and not all at once. There will also still be moderator material (graphite etc.) in the core and the geometry of the fuel is not of course optimised for explosive effect.

The best guide to what can happen is what occurred at Chernobyl, when the core meltdown blew off the 2000 tonne lid from reactor number 4 and devastated the plant - but did not flatten the area for miles around. What was left was an open mass of fissile material undergoing a nuclear fission chain reaction relatively slowly, but still generating intense volcanic quantities of heat. This may be similar to the well known "natural" nuclear reactor discovered in the Congo.

Figure 60 is a photograph of the Chernobyl reactor building after the explosion and core meltdown.

FIGURE 60

CHERNOBYL AFTER THE BLAST



Depending on how critical the reactor goes and how quickly, a wide range of explosive effects could probably be produced.

Some insight into what might happen can be inferred from the following extracts from the autobiography of nuclear engineer A. Stanley Thompson¹:

"In 1947 I participated in an orientation tour at the Hanford Works to see first hand the operation of a nuclear reactor. My strongest memory of that visit is the unearthly but beautiful streamers of blue radiance emanating from elongated objects at the bottom of a deep pool of water. The objects were spent fuel elements which had been removed from the reactor. The water above them protected the environment from their lethal radiation and also removed the heat from radioactive decay which otherwise would have melted the elements. The blue light was from "Cerenkov radiation," emitted when a particle released from the radioactive fuel element passed through the transparent water at a speed greater than the velocity of light in water. A physicist who had known Louis Slotin told me his story to teach me respect for the radiation depicted by that blue light."

"On May 21, 1946, at the Los Alamos nuclear weapons laboratory, Louis Slotin demonstrated his nuclear assembly of a plutonium sphere in beryllium shells. When he accidentally dropped the top beryllium shell into too close contact with the plutonium sphere, he created a momentary nuclear reaction stronger than he intended, with a millisecond flash of blue light and a noticeable increase in the temperature of the assembly. There were no jaw or claw marks or other immediate signs of the Jabberwock, but Slotin received a massive radiation dose. After nine days during which "his body was

1. "My Life in the 20th Century", A. Stanley Thompson, Spencer Creek Press 2000

dissolving into protoplasmic debris," he died. His death followed that of Harry Daghljan in a previous accident with the same assembly. "

Later, he gives the following account of an experimental test:

*"The third set of experiments, under the acronym, SPERT, at the National Reactor Test Station studied transients of reactor power. The reactor was composed of thin sheets of aluminium, bearing the nuclear fuel, immersed in a pool of water, the surface of the water being open to the atmosphere. Reactor power was slowly increased by gradually **pulling out control rods**. At a certain low power an **unstable oscillation** appeared suddenly and **built rapidly to violent proportions**, resulting in a flash of blue light from Cerenkov radiation and the explosive expulsion of water. The **peak of power was greater by a factor of thousands** than the level from which the oscillations had started. It was concluded that the unexpected instability was related to coolant boiling. I developed mathematical criteria to try to predict the threshold of reactor power at which such unstable oscillations would occur. "*

Thompson tells us here how unforeseen instabilities arose as the control rods were removed, building up rapidly into a huge power excursion. Clearly, for experts in nuclear reactor operations, there would be scope for tailoring the timing and intensity of the blast if they wanted to deliberately send a reactor critical.

It seems beyond the realms of likelihood that an aircraft crashing into the WTC more than 90 storeys above ground level would affect the operations of a clandestine nuclear reactor encased in a thick steel and concrete bioshield buried below the official 7 basement levels. The excavations for the WTC foundations were officially 27 metres deep. Either the reactor installations were already in place even deeper before the towers were constructed or they were installed at the time of the WTC construction. The reactor core was likely to have been at least 80 metres below the surface. For what purpose they were installed and what underground facilities they were powering, we can only guess.

Conclusion

The evidence demonstrates that the nuclear devices under the Twin Towers were nuclear reactors for the following reasons:

1. The residual volcanic temperatures which persisted for over 6 weeks at least. The underground fires were not finally extinguished till December 2001.
2. The pools of molten steel discovered under the towers, with emission of a nickel, chromium and vanadium aerosol from boiling stainless steel.
3. The vast quantity of radioactive fallout detected, which exceeds by at least 3 or 4 orders of magnitude the quantity that would have been produced by an atomic bomb.
4. The too coincidental "light memorial" identical to the Cerenkov Radiation that would be produced by a nuclear reactor core after meltdown and exposure to the atmosphere.

7.4 The China Syndrome

In 1974, the US Nuclear Regulatory Commission published a well known report called Reactor Safety Study (WASH-1400), generally known as the Rasmussen Report after its author. Some experts¹ believe it presents a too optimistic picture of the safety of nuclear reactors but it was the first official report to publish detailed information on how a core meltdown might occur and the likely consequences.

There are two main ways in which the Core Meltdown of a nuclear reactor can occur:

1. A Loss of Coolant Accident or LOCA.
2. The occurrence of a Transient.

Loss of Coolant Accident

As we discussed earlier, if the system which cools the core of a nuclear reactor fails for whatever reason, the radioactive decay heat of the nuclear fuel will melt the core, even if the reactor is shut down. The melting point of uranium fuel is 2,700 - 2,800°C, which far exceeds the melting point of the stainless steel containment vessel.

The primary cooling system in a Light Water Reactor (LWR) is pressurised to between 1,500 and 3,000 psi. The stresses on the pipework can easily be imagined and the consequences of a mechanical failure in the piping would be catastrophic at those pressures.

According to the Rasmussen Report, breaks in the small pipes (half to two inch diameter) in the primary cooling system are the single most important contributor to the probability of a complete core meltdown. This is understandable, since the smallest pipes have the thinnest walls and are under the greatest stress from the high pressure of the water they contain.

In the event of failure of the main cooling system, reactors are equipped with a backup cooling system called the Emergency Core Cooling System. This is designed to inject large quantities of water into the core to cool it down and prevent melting.

According to Dr Gordon Edwards of the Canadian Coalition for Nuclear Responsibility²:

"Realizing the potential danger to human health and the environment, engineers have provided each reactor with an Emergency Core Cooling System (ECCS) having a large reservoir of ordinary water, designed to cool the fuel in the event of a "Loss of Coolant Accident"

1. Dr. Gordon Edwards, Canadian Coalition for Nuclear Responsibility, <http://www.ccnr.org/rasmussen.html>

2. http://www.ccnr.org/feeder_pipes.html

(LOCA) caused -- for example -- by a pipe break in the primary cooling system.

*But there's a catch. The ECCS is not always available, even when the plant is operating at full power. Due to mechanical failure or operator error, the ECCS may be partially or totally disabled, and hence unavailable, unbeknownst to the plant operators. **It happens year after year; during certain stretches of time, the ECCS is not fully available.** The same is true of the other safety systems, such as the containment system, and the emergency shut-down systems. The Atomic Energy Control Board regularly records, measures, and publishes statistics on the unavailability of all safety systems at Canadian nuclear reactors. Consequently, there is a slight but very real chance that one or more of these systems will not be available when needed. In such circumstances, of course, the probability of a core meltdown is much greater than would normally be anticipated."*

The actual performance of an ECCS in a real emergency is also an unknown quantity. If the reactor gets too hot too quickly, the pipes of the ECCS may be damaged or start to melt - or become so hot that when coolant water comes into contact with them, it turns to steam and explodes. The scenario is subject to many unknowns.

The following excerpt¹ illustrates this:

"Will the ECCS be successful in rewetting and cooling the fuel in the reactor as predicted on the basis of extrapolations from laboratory tests? Is it possible that the rewetting of some fuel channels will delay for an extended period of time the rewetting of others due to "short-circuiting" of the emergency coolant? Will fuel bundle and fuel channel distortions under accident conditions interfere with cooling by the ECCS to the point that additional gaseous fission products will be released from the uranium oxide fuel?"

There are no simple answers to these and other questions and therefore an analysis of the consequences of a LOCA involves a process of conservative assumptions in some cases and best engineering judgment based on extrapolations from available experimental information in others."

One can see that in fact, there is no guarantee that the emergency cooling systems will work as planned in the event of a LOCA.

As the core meltdown proceeds, the coolant system pipes will be melted and the reactor core will come in direct contact with the coolant - water or steam. This generates a violent explosion which will probably at the

1. <http://www.ccnr.org/CANDU-Safety.html> "Excerpts from: Nuclear Policy Review Background Papers Report ER81-2E Cat. No. M23-14/81-2E Department of Energy Mines and Resources Government of Canada Ottawa, 1982."

very least rupture the pressure vessel of the reactor, if not the containment building itself.

This Core Meltdown scenario would certainly account for the pools of molten steel discovered weeks later and the continual generation of intense heat by the molten core, broiling the rubble in a pressure cooker into a tiny sub-micron aerosol of vaporised glass, concrete, stainless steel and soil.

Yuvchenko's description of the exposed Chernobyl reactor core again springs to mind: a volcanic crater.

Transient

A "transient" is a situation such as an uncontrolled increase in reactor power or a loss of the normal flow of coolant. These events mean the reactor will have to be shut down and the decay heat removal systems operated to keep the core from overheating.

This again emphasises the critical dependence of a nuclear reactor on the cooling systems: any failure in the primary cooling system will mean the reactor must be shut down and a backup cooling system put into operation.

Stanley Thompson gave a graphic description of what happened to a test reactor when the control rods were slowly removed: unstable oscillations suddenly appeared as rapid fission occurred which pushed the reactor power output to thousands of times the stable level.

A further extract from the Rasmussen Report is given here, which describes a number of transients or "power excursions" which have occurred in nuclear reactors:

B1.2.3.2 Borax I Reactor (Ref. 35).

*In 1954, at the National Reactor Testing station in Idaho, the Borax I reactor was deliberately subjected to a potentially damaging **power excursion** in reactor safety studies: A power excursion lasting approximately 30 milliseconds produced a peak power of **19,000 megawatt-seconds**.*

*The power excursion **melted most of the fuel elements**. The reactor tank (1/2 inch steel) was **ruptured** by the pressure (probably in excess of 10,000 psi) resulting from the reaction between the molten metal and the water.*

The sound of the explosion at the control station (1/2 mile away) was comparable to that from 1 to 2 pounds of 40 percent dynamite.

B1.2.3.3 SPERT 1-D Reactor

During the final test of the destructive test program with the SPERT 1-D core, damaging pressure generation was observed. Pressure

*transducers recorded the generation of a pressure pulse larger than 3000 psi which caused the **destruction of the core**.*

*The pressure pulse occurred some **15 milliseconds after initiation of the power excursion**. The power excursion rapidly overheated the fuel plates; the increased temperature **melted** the metal and the cladding of the fuel plates.*

*After the transient, **much of the fuel that had been molten was found dispersed in the coolant**.*

B1.2.3.4 SL-1 Reactor

*In January, 1961, a nuclear excursion occurred in the SL-1 reactor in Idaho. The total energy released in the excursion was approximately **130 MW-sec** (Ref. 51). Of this, 50 MW-sec was produced in the outer fuel elements in the core. This portion of the energy was slowly transferred to the water coolant over 2 sec period, and no melting (uranium-aluminium alloy) of the outer fuel elements occurred.*

*About 50 to 60 megawatt-seconds of the total energy release was promptly released by 12 heavily damaged inner fuel elements to the water coolant in less than 30 milliseconds [a millisecond is 1 one thousandth of a second]. This prompt energy release resulted in rapid steam formation in the core which accelerated the water above the core and produced a water hammer that hit the pressure vessel lid. **The vessel, weighing about 30,000 lbs with its internals, sheared its connecting piping and was lifted approximately 9 feet into the air** by the momentum transferred from the water hammer.*

Calculations of the mechanical deformation of the vessel indicate that about 12 percent of the prompt energy release or 4.7 percent of the total nuclear release was converted into mechanical energy (Ref. 52).

In each instance, under differing circumstances, a hot molten material fell, dropped, or spewed into a mass of cooler liquid and destructive pressure generation resulted. The complex mechanisms triggering this type of reaction are not completely understood.

It can be seen how quickly a nuclear reactor can go out of control. Within 30 milliseconds, enormous power output is reached and if control was lost, a Chernobyl type event or a nuclear fission explosion would take place. In the Idaho SL-1 incident described above, the release of 50MWsecs of energy in only 30msec is an instantaneous power output of 1.66 billion Watts. These three events were relatively mild and controlled - one can only imagine what would happen if a reactor was sent critical intentionally or if its coolant systems were deliberately destroyed.

In the case of the WTC, it seems that this is indeed what happened. The reactor core "went critical" and entered an uncontrolled fission chain reaction. We deduce this from the very large quantity of fission products

and the violent nature of the explosions detected, both seismically and in the visual characteristics of the blast, akin to an underground nuclear explosion.

In the case of Chernobyl, it was an event like this which blew the 2000 tonne lid off the core and contaminated much of western Europe with radioactive fallout.

There have been several other known core meltdowns with nuclear reactors: Chernobyl in 1986, Three Mile Island in 1979, SL-1 at the reactor test station in Idaho in 1961, EBR-1 at the same place in 1955, the Fermi fast breeder reactor in 1966 which it is said almost destroyed Detroit. Brown's Ferry nearly melted in 1985. How many there have been outside the USA where information is almost impossible to obtain is anyone's guess, not counting the host of lesser nuclear accidents that have occurred.

To this, we now have to add the certainty of further clandestine nuclear reactors, unknown to the IAEA or national regulatory bodies.

The 1993 WTC Truck Bomb

Earlier in this report, we commented on the location of the centrifugal chiller units at the bottom of the WTC basement. These produced chilled water for the air conditioning system in the WTC complex. We noted that the amount of cooling equipment seemed to be almost twice as much as would be expected for the area of office space it had to serve.

In 1993 a truck filled with urea nitrate was exploded in the car park on the B-2 level under the WTC. This caused extensive damage and put out of commission the 7 seven thousand tonne centrifugal chillers, located in the three floor high space from level B-3 to B-6 (see Figure 55 on page 132).

It is possible that this was an earlier attempt to destroy the entire WTC site by destroying the coolant system for the nuclear reactors further below. By instantly destroying the cooling system, an emergency would be created giving the reactor personnel perhaps only seconds in which to react to prevent a catastrophic power excursion. The fact that this did not occur indicates that there may have been a separate emergency cooling system, also sourced from the Hudson River - or perhaps the reactor was shut down for maintenance, giving them more time to react. We will probably never know.

During the second attack in 2001, the explosions in the basement which went off when the plane hit may have been used to make sure of the job, destroying both the primary cooling system and the backup ECCS and decay heat cooling systems.

Who would have had knowledge concerning the existence of this clandestine nuclear power station and its security arrangements and would be able to penetrate that security to critically sabotage two

reactors, synchronised with aerial diversions that served to act as a cover for the cause of the towers' collapse.

7.5 Evidence of Anomalous Facilities

Evidence of Underground Construction

Is there any direct evidence for the existence of these underground facilities under Manhattan, apparently so extensive that they required their own power supply from two nuclear reactors?

An intriguing photograph was taken during the collapse of the WTC from the north side of the site, looking due south. The photograph shows the dust cloud from the collapse of a tower and on the left hand side we can see a street covered with dust but now clear of active clouds. This indicates that this must be the second collapse in progress.

In the middle of the photograph at the front and on the right hand side however, can be seen two powerful upwellings of dust clouds from independent sources in or on the ground.

FIGURE 61

UNDERGROUND UPWELLINGS



The source on the right in front of the office block with the stepped roof is particularly clear. The source in the middle also looks like a dense upwelling, whereas the dust cloud behind it filling the street as it flows down from the WTC is much less dense.

These upwellings are some distance from the WTC itself. Assuming there was an extensive underground facility or small city under Manhattan, there would have been a certain number of air vents and

other exits to the surface. When the reactors exploded, the force of the blast would have also been channelled through the underground corridors and hollow spaces, forcing dust and debris up into the atmosphere through these exits.

These upwellings could be showing the location of other entrances or access points to the underground facility. They show strong dust and smoke sources at ground level, several blocks away from the WTC.

Evidence of Advanced Technology

So far we have presented extensive forensic evidence that clandestine nuclear reactors were installed under the WTC. If you like, we have the bullet, which means there must have been a gun, but the gun itself disintegrated when it was fired.

Was there any other evidence before the event that anomalous or advanced technology was present at the WTC? Because whatever was the nature of the nuclear reactors under the WTC, they were definitely of an unconventional or advanced type. We know this for two reasons:

1. The large amount of Zinc produced, atypical of nuclear explosions.
2. The fact that hundreds of tonnes of Uranium could undergo fission, proven by the hundreds of tonnes of Barium and Strontium, but without destroying an area for fifty miles around New York.

When the WTC was constructed, a famous “metal sculpture” was commissioned from the German artist Fritz König. It was installed in the plaza between the towers, where it rotated once every 24 hours.

FIGURE 62

KÖNIG'S SPHERE IN WTC PLAZA



König called it the “Great Spherical Caryatid”. A caryatid is a female version of Atlas, who carried the world on his shoulders. The sculpture was supposed to signify world peace through commerce. “König's Sphere” as it became known survived the destruction of the towers

largely intact and was re-installed in Battery Park in 2002. The original height of the sphere was 7.62 metres, which is a significant harmonic number in wave mechanics.

In the light of what we now know, that advanced nuclear reactors were installed beneath the towers, this supposedly bronze and steel “metal sculpture” that managed to survive pulverisation by thousands of tonnes of falling steel and concrete, becomes an intriguing object. At first glance, it looks more like a functional technical artefact than a piece of abstract modern sculpture. It seems to have little to do with “peace through commerce” and more the function of a collecting device at the focus of a parabolic reflector or other wave concentrator.

7.6 The WTC Memorial

After the WTC collapse, an international competition was held to select an architectural design for a permanent memorial to mark the WTC site.

The winning design - and a number of other entries - have as their central feature a sunken pool of water covering the footprint of each tower.

Visitors will descend through a passageway to the side of the pool, which they can then look at through a veil of falling water, cascading down the sides of the sunken enclosure.

Water is one of the best radiation absorbers. It is also inconspicuous. Covering the footprint of each tower with water and protecting visitors with a curtain of water is an effective way to contain at least the direct radiation emitted upwards by the remains of the reactor cores which must still be down there, buried 100 metres below the ground.

FIGURE 63

WTC MEMORIAL



The artist's impression shows the deeply sunken square pools that will cover the base of each tower.

7.7 Effects of A Nuclear Explosion on New York

What will be the long term effects of this clandestine nuclear explosion on New York and its inhabitants?

The best indication comes from the testimony of Dr. Henry Kelly, President of the Federation of American Scientists before the Senate Committee on Foreign Relations on March 6, 2002¹. Dr Kelly presented three hypothetical scenarios to illustrate the likely effects of a radiological attack on a US city, releasing radioactive material without using a nuclear explosion itself.

Dr. Kelly gives an example of a dirty bomb exploded at the tip of Manhattan, consisting of just one cobalt “pencil” used for food irradiation. We will quote from that example here.

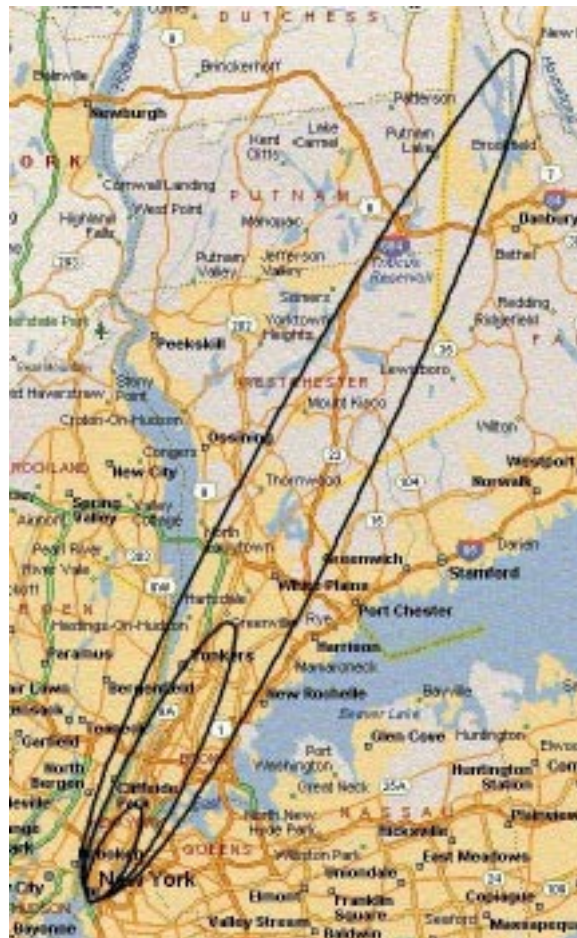
*“Now imagine if a single piece of radioactive cobalt from a food irradiation plant was dispersed by an explosion at the **lower tip of Manhattan**. Typically, each of these cobalt “pencils” is about one inch in diameter and one foot long, with hundreds of such pieces often being found in the same facility. Admittedly, acquisition of such material is less likely than in the previous scenario, but we still consider the results, depicted in figure two. Again, no immediate evacuation would be necessary, but in this case, an area of approximately one-thousand square kilometres, extending over three states, would be contaminated. Over an area of about three hundred typical city blocks, there would be a **one-in-ten risk of death from cancer** for residents living in the contaminated area for forty years. The entire borough of Manhattan would be so contaminated that anyone living there would have a one-in-a-hundred chance of dying from cancer caused by the residual radiation. **It would be decades before the city was inhabitable again, and demolition might be necessary.**”*

Dr. Kelly presented the following diagram to illustrate his meaning:

1. http://www.fas.org/ssp/docs/kelly_testimony_030602.pdf

FIGURE 64

EFFECT OF ONE COBALT PENCIL ON NEW YORK



Dr. Kelly then went on to show what area of Manhattan would be contaminated by this one cobalt pencil to the same degree as the area affected by Chernobyl in 1986.

*“For comparison, consider the 1986 Chernobyl disaster, in which a Soviet nuclear power plant went through a **meltdown**. Radiation was spread over a vast area, and the region surrounding the plant was permanently closed. In our current example, **the area contaminated to the same level of radiation as that region would cover much of Manhattan**, as shown in figure three. Furthermore, near Chernobyl, a larger area has been subject to periodic controls on human use such as restrictions on food, clothing, and time spent outdoors. In the current example, the equivalent area extends fifteen miles.”*

*“To summarize..... materials like caesium, cobalt, iridium, and **strontium** (gamma emitters) would all produce similar results. No immediate evacuation or medical attention would be necessary, but long-term contamination would render large urban areas useless, resulting in severe economic and personal hardship.”*

This is the diagram Dr. Kelly presented, showing the area contaminated by one Cobalt pencil to the same degree as Chernobyl if a dirty bomb was to occur at the tip of lower Manhattan:

FIGURE 65

ONE COBALT PENCIL - EQUIVALENT CHERNOBYL EFFECT



However, what has happened to New York is far, far worse. A nuclear reactor - indeed two nuclear reactors - have undergone a core meltdown and exploded at the tip of lower Manhattan, contaminating the entire city and surrounding area to the same degree as Chernobyl. Not one Cobalt pencil but thousands of Cobalt pencils.

New York City should be evacuated and much of Manhattan should be demolished. What is to be done about this enormous crime against humanity?

7.8 Historical Radiation Exposure Experiments

Lest we think that the US Military-Industrial Complex would never commit such a crime against “its own people”, the deliberate and clandestine exposure of US and other citizens to radioactivity and radiation is in fact a routine practice. Since the Second World War, the

US Government has deliberately exposed and contaminated large numbers of its citizens systematically, both civilian and military, with some of the most dangerous and toxic substances known to man.

It is now well known how thousands of US and British military personnel were ordered to walk towards the nuclear fireball after atomic weapons tests in New Mexico and Australia in the 1950s and 1960s. The purpose was purely to see what effect the radiation would have on them.

In the 1960s, plutonium was injected into pregnant women - again, just to see what would happen.

In November 1986, the US Congressional Sub Committee on Energy Conservation and Power released a report under Congressman Edward Markey entitled "American Nuclear Guinea Pigs: Three Decades of Radiation Experiments on US Citizens"¹.

The report detailed the systematic injection and administration of radioactive isotopes and compounds to US citizens since the 1940s to see when and at what level damaging (irreversible) effects would occur.

In 1994, radioactive substances were still being surreptitiously administered to prisoners in New York penitentiaries.

These experiments are redolent of the barbaric practices of Joseph Mengele and his Japanese counterparts on human victims during the Second World War. Indeed, given what has come to light about Operation Paperclip, the mass transfer of Nazi war criminal scientists to the USA after the Second World War, plus the recruitment by the CIA of numerous Nazis, one could say it is merely a seamless continuation of those practices.

The deliberate contamination of New York with radioactive fallout is far from being exceptional. It is simply one in a long line of radioactive contamination experiments stretching back over 60 years. These "experiments" are being continued today with the widespread use of Depleted Uranium munitions in Iraq, Kosovo and Afghanistan.

To these individuals, the administration and release of radioactive contamination against the population is routine. It is Standard Operating Procedure.

To borrow another quotation used by A. Stanley Thompson:

"God rest you merry Innocents

"While innocence endures"

Ogden Nash

1. See the National Security Archive at George Washington State University www.gws.edu

8

Conclusion

This report has presented indisputable and overwhelming evidence that the Twin Towers of the World Trade Centre were destroyed by the explosion and core meltdown of at least two nuclear reactors.

The key irrefutable evidence is the presence of radioactive fallout in the dust residue. This “smoking gun” evidence lays the framework for then understanding all the other extraordinary physical anomalies - the intense volcanic subterranean heat which persisted for months, literally boiling away concrete, the seismic spikes characteristic of underground blasting, the free fall instant collapse of the buildings and the eruptive ejection of dust and rubble high into the atmosphere and over Manhattan.

There is no doubt that this was one of the single worst atrocities ever committed by individuals intent on terrorising the people of the world.

The question is - who are these terrorisers? Who could have known about these clandestine nuclear reactors 80 metres under Manhattan? Who could have gained access to them? Who could have co-ordinated their deliberate meltdown with the crashing of two commercial aircraft (if they really were standard commercial airliners) into the buildings? Why deliberately tell the residents of New York that the dust was completely safe when even simple asbestos precautions could have greatly reduced exposure?

To ask these questions is to answer them. Only elements of the US Military Industrial Complex and so called “shadow government” could have orchestrated this depraved and heinous act of *Agent Provocateurism*, from which has flowed an unprecedented War of Terror against the world.

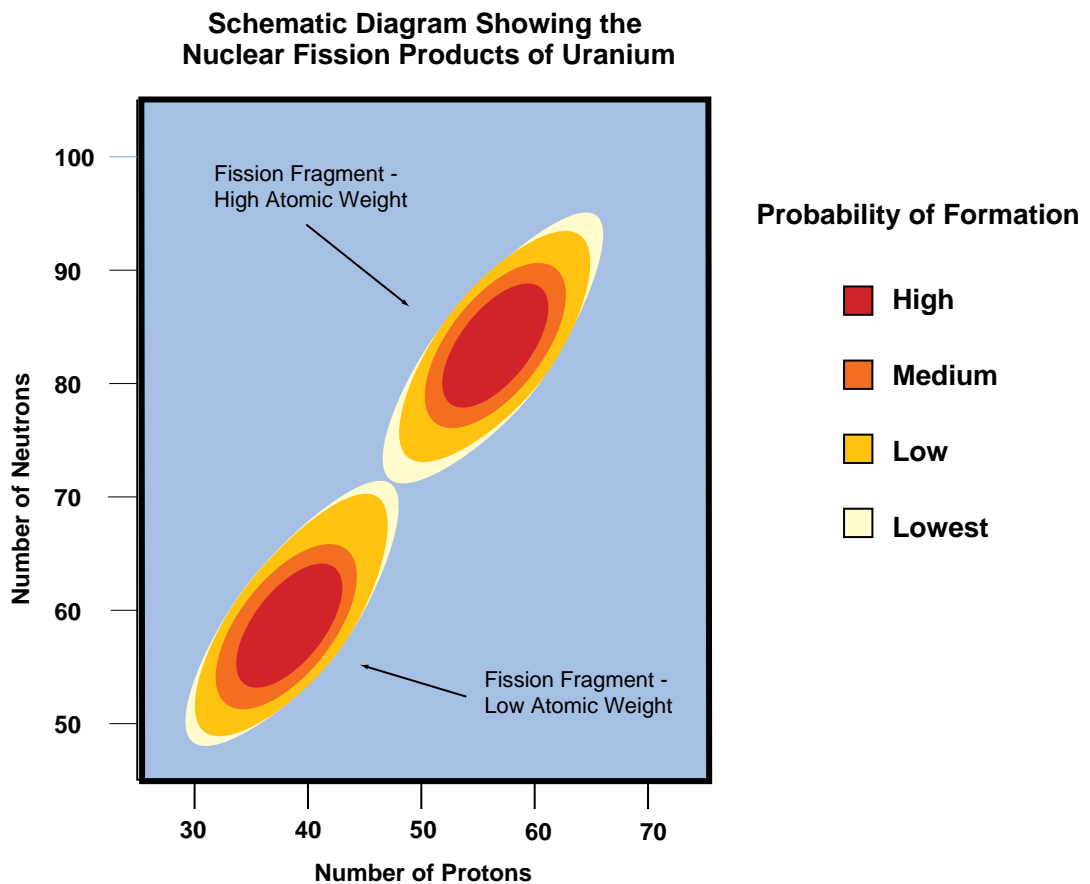
Cui bono?

Conclusion

Appendix A: The Complexity of Fission

Nuclear fission is even more complex than the various pathways described in Chapter 3. The following schematic diagram shows that when an atom of Uranium undergoes fission, into only two fission fragments or daughter nuclei, these can span the entire Periodic Table below Uranium from Thorium to Helium.

FIGURE 66



However, as we have seen, in a very energetic nuclear event - such as an atomic bomb - we do not just see two fission fragments per Uranium atom but three or more - the daughter nuclei are themselves disintegrated by the intense neutron flux into smaller atoms. The heavier fission fragment in particular - Xe, Rn, Th, Pb, etc. - will in turn fission into lighter elements.

Something like this is what created the very high concentration of Zinc, so closely linked to the concentration of Barium.

You can appreciate that there is no public data available on what the distribution of elements produced would be from a nuclear explosion. Such "nuclear test data" is classified and would vary greatly depending on the conditions of the explosion, the type of bomb etc. The schematic diagram is for two fission fragments only and applies to the relatively low energy fission of uranium in a civilian power reactor.

What can be said is that such extra levels of fission will be accompanied by an intense neutron flux and it may unfortunately be stretching coincidence too far to believe that the particularly high concentration of Zinc - the preferred option for the military "doomsday device" - arose purely by chance.

Quantity of Uranium in Reactor Core

Several times in the report, we have given a very broad estimate of the amount of Uranium that must have been originally present in each reactor. This has been derived from the concentration of fallout - Barium, Strontium, Zinc - in the dust.

For non-chemists, it is easy to fall into the trap of thinking that 100 tonnes of Uranium would produce 100 tonnes of Strontium etc.

Things are a bit more complex than that. As you now know, each atom of Uranium can split into two or even three fission fragments in many different ways. A wide range of fission pathways is followed and only some of the Uranium in the core will go down each path.

So taking Strontium again, the mean concentration that the USGS measured in the dust was 726ppm. This means that if there were 200,000 tonnes of dust produced by the destruction of the buildings, and we know the USGS found high levels of Strontium in all the samples they measured all over Manhattan, we can assume that the total amount of Strontium produced was:

200,000 tonnes x 726ppm

In SI units this equals

$2 \times 10^8 \text{ kgs} \times 0.000726 = 145,200 \text{ kgs}$ (or 145 tonnes).

Now what we really do not know is - how much of the Uranium originally present fissioned through the Strontium pathway? Looking back at

Figure 2 on page 7, you see two of the main pathways, going through Strontium and Barium. As we know, there are many, many others.

The main thing to realise here is that the lower the proportion of the original Uranium that fissioned through Strontium, the more Uranium there must have been there in total in the first place.

If all the Uranium just followed the two Barium/ Strontium pathways, then 50% of the Uranium atoms present would have fissioned through Strontium to produce 145 tonnes of Strontium. If only 10% of the original Uranium produces 145 tonnes of Strontium, then there must have been a lot more Uranium present.

But how much Uranium produces one tonne of Strontium? The answer is not one tonne! This is where we have to bring in the concept of the *mole*.

One atom of Uranium splits into two pieces to produce one atom of Strontium and one atom of Barium. But an atom of Uranium and an atom of Strontium do not weigh the same. The Uranium isotope that fissions has an atomic weight of 235 - the Strontium isotope has an atomic weight of 90.

Chemists discovered that 90 grammes of Strontium or 235 grammes of Uranium or 16 grammes of Oxygen all contain the same number of atoms. This makes sense since each atom has a different weight - so the weight of that element in grammes equal to the atomic weight of the element will contain the same number of atoms.

That number is a constant (Avogadro's Number = $6.022 \times 10^{23} \text{ mol}^{-1}$) and the weight of an element that contains that number of atoms is called a mole.

Simply think of it like this - chemical reactions and nuclear fission occur between atoms (or molecules etc.). 1 atom of Uranium produces 1 atom of Strontium. But 1 atom of Uranium weighs 235 atomic units while 1 atom of Strontium weighs only 90 atomic units (the other 145 atomic units go into a Barium atom and free neutrons).

Since 1 atom of ^{235}U weighs 235 atomic units and 1 atom of ^{90}Sr weighs 90 atomic units, 235 grammes of Uranium has the same number of atoms in it as 90 grammes of Strontium.

1 mole of Uranium weighs 235g and 1 mole of strontium weighs 90g.

To produce 145 tonnes of Strontium therefore, there must have been originally

(EQ 12)

$$145 \times \frac{235}{90} = 380 \text{ tonnes of Uranium}$$

But this was only the Uranium to produce Strontium (and its associated Barium).

If 50% of the Uranium fissioned through Strontium, then the total amount of Uranium would have been 760 tonnes. If only 30% of the Uranium fissioned through Strontium, then there would have been nearly 1300 tonnes of Uranium originally.

What this illustrates beyond doubt is that the high concentration of radioactive fallout in all of the dust means the only possible source was a nuclear reactor - not a small bomb containing only tens of kilogrammes of fissile material at the most.