ABSTRACT

Bitcoins has emerged as a priceless must own asset today. It is often referred to as a decentralized digital currency, though it fits to be called; an electronic asset (Lewis, n.d). Lewis continues to argue that, if the internet were a country, bitcoin would be its currency. The economic theory, whose main elements include; nature space that houses, diversity; human space that holds satisfaction of basic needs; social space that holds plan and market; and world space holding world systems all summed up into the reaction of supply and demand. The activity follows the three economical natural laws; self-interest, competition and supply and demand.

There are two parts to bitcoin pay which includes; (1) payments of bitcoins from one person to another, irrespective of geographical location or jurisdiction, and potential users who can be, banks, due to the cost/benefit of the brick & mortar banking model, and regulatory cost. To make this bitcoin payment, one requires a private key of the address you want to spend from. Need to make it hard for people to steal private keys, and having backups in case they are lost is a critical balance. (2) Block control, from thousands of independent block validators keeping the system true (just like a team of accountants and auditors, who are working together to audit the same ledger). This independence and mutual validation of transaction and blocks is supposed to prevent any one person or entity from adding rogue blocks and dominating the network with their influence.

KEYWORDS: Bitcoins, Digital Currency
This paper does not go to the depth of getting a Bitcoin on the table, but as figure 1 shows, there has been a continuous development of production of Bitcoins and circulation to the level after 2009, the circulation stabilized at 18 million per year and is projected to continue this way to the coming years.

Source: Blockchain.com

Figure 1: Cumulative BTC in circulation

The figure 1 shows that BTC circulation has a constant growth at 18 million after year 2009. From some block on Quora work, as of June 1st, 2017 there were 16,366,275 BTC out of a total 21,000,000 BTC in theoretical supply, which has yet to be mined. A block (think of it as transaction data organized in a digital ledger) introduces 50 new coins into the bitcoin ecosystem. This quantity mined halves every 210,000 blocks. For instance, the reward for mining a block was most recently cut in half on July 9th, 2016 from 25 bitcoins to 12.5 bitcoins as reward for solving the Byzantine general’s problem. The next halving event occurs every four years with the next one slated for 2020 with a block reward amount of 6.25 bitcoins. We can visualize the limit of coins mathematically as the summation of this geometric series below:
As illustrated above, the quantity of BTC will approach an asymptotic limit approximating 21 million due to ever increasing computational demand if the BTC does not undergo a schism and remains on a Proof of work (PoW) requiring ever significant GPU capacity to mine. Since, a CPU (central processing unit) has always been called the brains of the PC, it is good to note that, that brain is being enhanced by another part of the PC(Personal Computer), called the GPU (Graphics Processing Unit), which is the soul of a PC (Krewell, 2009).

This is purely theoretical as proposed in Satoshi Nakamoto’s white paper and resemble something like 20999999.9… BTC as you stretch out the time horizon indefinitely.

As the circulation goes on, Wolff-Mann, (2018) notes that, Bitcoin has been criticized for its use towards illegal transactions, its high electricity consumption, price volatility, thefts from exchanges, and the possibility that bitcoin is an economic bubble. It has at the same spirit been used as; a tool for speculation into riches, and as means for investment towards development towards man’s poverty eradication.

Irrera & Belowitz, (2018), indicates that more former watchdogs and financial services executives have been joining the crypto currency ranks, as the nascent sector looks to mature and cope with more regulatory scrutiny. They add that, interest in crypto currencies has grown, but the sector lacks the same level market infrastructure available to investors in other asset classes.

The actual process of gaining to Bitcoins is through mining. As has been noted earlier in this paper, Bitcoin operates as a P-P network where users of Bitcoins operate as a small bank of Bitcoins. From the natural, the paper money is handled by Governments who decides on when to print and circulate the money. Since Bitcoin as noted is an internet currency, have no central bank, it depends on miners who use special software to solve MATHS problem, Antonopoulos (2014). The security of bitcoins then depends on the network of these miners, who also has the synergy to solve the math. Graphics cards have been developed and later improved to Application Specific Integrated Circuit (ASIC) for mining. Chip as computer professional bears witness; are the way to go, since in Chips, you can store some data. Due to network problems in solving Math problems, these networks join into pools who can find solutions faster and trustfully. Mining for Bitcoin is an important part area that helps to ensure that there is transparency and accountability, fairness and truthfulness. The pools help to keep the network stable, safe and secure, https://www.BitcoinMining.com. In summary, to get Bitcoin in circulation,
Hardware is required, for instance (ASIC machines). The use of hardware is based on the price per hash, and electricity efficiency for miners. Software are also required, for instance, CGMiner an open source written in C, which is based on the original code of CPU Miner. This software has many features but the main ones include: fan speed control, remote interface capabilities. One can also mine using cloud (hashing). Bitcoin cloud mining enables one to earn Bitcoins without having to manage hardware, software, electricity, bandwidth or even other offline issues.

**DEFINITION**

1. **Bitcoins** is a type of digital currency in which a record of transactions is maintained and new units of currency are generated by the computational solution of mathematical problems, and which operates independently of a central bank. Bitcoin is the name of the best-known crypto currency, the one for which block chain technology was invented. *(Tara, 2016)*.

2. **Cryptography** is the practice and study of techniques for secure communication in the presence of third parties called adversaries *(Rivest 1990)*. The term has the implication of a ‘hidden secret’, *(Statista 2016)*.

3. **Crypto currency** is a medium of exchange using cryptography to secure the transactions and to control the creation of new units *(Greenberg, 2011)*. Crypto currencies are a subset of alternative currencies, or specifically of digital currencies *(Schueffel, 2017)*. A crypto currency is therefore, a digital or virtual currency designed to work as a medium of exchange. It uses cryptography to secure and verify transactions as well as to control the creation of new units of a particular crypto currency. Essentially, crypto currencies are limited entries in a database that no one can change unless specific conditions are fulfilled. A crypto currency is a medium of exchange, such as the US dollar, but is digital and uses encryption techniques to control the creation of monetary units and to verify the transfer of funds. A crypto currency is a digital or virtual currency that uses cryptography for security. All currencies need some way to control. *(Bellare, *et al.* (2005) and *Menezes, Oorschot, and Vanstone.* (20105)*, adds that cryptography is about constructing and analyzing protocols that prevent third parties or the public from reading private messages; various aspects in information security such as data confidentiality, data integrity, authentication, and non-repudiation are central to modern cryptography. *(Greenberg, 2011)*, *(Schueffel, 2017)*)
**Blockchain** is the technology that enables the existence of crypto currency (among other things). It is a system in which a record of transactions made in bitcoin or another crypto currency are maintained across several computers that are linked in a peer-to-peer network. A block chain (sometimes called "snake oil") which are readable by the public are widely used by crypto currencies, is a growing list of records, called blocks, which are linked using cryptography, (Hackett, 2016)

**Computer science** Computer science is defined as the study of computers and algorithmic processes, including their principles, their hardware and software designs, including their implementation, and their impact on society (Tucker *et. al.*, 2003).

There is no denying that the internet has changed the world we live in. It has dramatically revolutionized many different fields and is affecting both human relationships and commerce, giving rise to numberof technologies that alters how the society interacts and works. Among these technologies, we can find the crypto currencies.

This technology has innovated how payment systems work. It has made it possible to perform international transactions with a very low operational cost, but also imposes a series of regulation related challenges since the system is not governed by any kind of governmental agency, whereas its users are solely responsible for its operation. Some countries have issued information and regulations on the use of crypto currencies, but these initiatives, most of the time, do not provide definitive answers regarding how this instrument should be treated, and how companies interested in their use should do so.

**BACKGROUND**

Bitcoin is a digital asset and a payment system that was invented by Satoshi Nakamoto who published the invention in 2008 and released it as open-source software in 2009. Since open source are also becoming a power house tools for the future. The system is peer-to-peer; users can transact directly without an intermediary. Transactions are verified by network nodes and recorded in a public distributed ledger called the block chain.

Satoshi Nakamoto (the team of persons) is the one who designed bitcoin and created its original reference implementation. Patron, (2014), states that Bitcoin, a P2P Foundation, was dreamt and developed by Nakamoto, who is said to have lived in Japan, born on 5 April 1975. Wallace, (2011), declares that, the true identity of Nakamoto has mostly focused on a number of cryptography and computer science experts who make us keep guessing of his existence and descent. Bitcoin became the
first decentralized crypto currency in 2009. Since then, numerous crypto-currencies have been created (Schueffel 2017).

As computer programmers become fascinated with the digital currency Bitcoin, we learn about the impending global impact of this amazing new technology (Mross 2018). Bitcoin is at an accelerated stage of its existence. While a few trolls here have chosen to label the first-ever grassroots bootstrapped financial system as "tulips" and a "ponzi scheme", the much write up on Bitcoin gives a different story. The Bitcoin is therefore, a system that is being built, for normal people, to help them take control of their own financial future. Unlike the legacy system, there aren't numerous controls and rules. It’s up to
user to determine the level of engagement. Through this system, one can experience the freedom of exchange without worrying which part of the globe, worry about banking hours, wire fees, or even other associated global trade regulations. This article is about people working with Bitcoin, and the positive influence it has now and will in the future, its impact to social fabrics, but of core is the near future mankind is approaching to very fast.

The block chain is a decentralized ledger of all transactions across a peer-to-peer network. Using this technology, participants can confirm transactions without a need for a central clearing authority. Potential applications can include fund transfers, settling trades, voting, and many more. The big names in the block chain include; Buterin, Vitalik, behind the world’s second most valuable crypto currency today, Ethereum. Antonopoulos (2014) the greatest advocates of Bitcoin, Block chain technology, and the principles of decentralization.

Antonopoulos (2014) offers strategic consulting to a small number of cryptocurrency companies, as well as offering expert witness testimony as an expert in the security, technical details and use of crypto -currencies. In (Bradbury, 2013) reported that Charles Lee, not as invisible as Satoshi Nakamoto, came in with Litecoin as the crypto-currency best suited for smaller, lightweight transactions like online retail shopping, while Bitcoin is the currency for more heavyweight transactions like international payments. Ridley, (2017), mentions Nick Szabo’s expertise with crypto-currency started back in 1998 with the creation of the BitGold proposal, the predecessor of Bitcoin. Ludwig, (2013), notes that Brian Armstrong co-founded crypto wallet and exchange Coinbase in July 2011. Coinbase was envisioned as a Bitcoin marketplace that would enable people to purchase the crypto-currency more easily.

Dibbell, (2008) notes that Brock Pierce, a venture capitalist and entrepreneur with an extensive track record of founding, advising and investing in disruptive businesses, pioneered the market for digital currency in games, and was one of the largest investors in the Ethereum crowdsale. Then (Coin telegraph 2013- 2018), reports of Vinny Lingham’s journey in Block chain which began with his startup Gift, a service offering Amazon purchases using Bitcoin.

**BITCOIN A PRICELESS ASSET**

Bitcoin is definitely a priceless asset, an asset to the current history of the world that we cannot place a price on. Its success got the current generation in the world history by surprise. Its steady growth has buffed the economic giants of the world today. There is no government that has been able to stop its operation or even control it. No financial institution, nor political power that has been able to cab its spread. Bitcoin is credited to Satosh Nakamoto and his co-developers as those indispensable figures for the success of the bitcoin. The usefulness of this popular cryptocurrency will become more and more apparent when the diacodium ‘no buy and sale laws’ become operational. Rev. 13:11-18. ‘The time of
abomination of desolation, Daniel 12:11, Mark 13:14’... Will become handy when these are enforced on those who will not accept the mark of the beast, ‘666’.

**BITCOIN AND THE BEAST**

**The Beast of Bible Revelation**

There will come a time in the near future when standing for the greatest TRUTH(Jesus Christ) ... will forfeit ones right to buy and/or sale. Bitcoin then become a divine blessing in disguise that has come in and has been established beyond the powers of the world, the borders of nations, religious impetus, and the social status of the people of the world. The UN(IMF) has nothing to say about it, the Government continue watching with wonder of the spread of this asset, and Central banks have no economical explanation to it and the society has given up monitoring its influence. Bitcoin has proved to be resistant to censorship, has become the most decentralized asset and therefore, its immense open spread. Owning a bitcoin is the most sensible thing to do in the world today, and more so, when the reality of Bible revelation story begin to play.

**THE PROPHECY AND TRUMPETS**

The world has endured the endless economic down downs in the past. Mergers and acquisitions have experienced their waves. It is therefore no secret that the recent economic crises, in the midst of mergers and acquisitions, in the era of recessions, in the current economic expansion are long overdue. The emergence of world recessions, the currencies drops in many countries, the action of BRETEXT, is but symptoms of things to come. The economic crash could be rescued by the Bitcoin. Bitcoin has proved to be a priceless resistant to censorship, and has become the most decentralized asset and therefore, owning a bitcoin in those days might be the most honorable thing to do, beginning now in the world today.

Owning a Bitcoin will be critical when the true season of dark days in the economy finally downs. Soon, the Bible records, God will intervene in the history of humanity, and when this time finally come, all paper financial tools will be wiped out. Should the financial markets wake up and find out that their growth projections are not attainable, Should the governments get to accept that their sky rocketing budgets cannot be attained nor sustained, and Should the it became a reality that everyone must adjust to reflect the prevailing reality of contradicting economic activity across the whole world, the financial market will be put to the test.

The impact that will be triggered in the financial market will be something that our minds cannot fathom now, nor imagine that it will ever happen. Given the current debt levels of our governments, companies,
consumers (individual families), will it be helpful to own a Bitcoin, especially when the seven trumpets begin to SOUND.

**THE PROPHETIC TRUMPETS**

There are 7 trumpets that are soon going to be sounded, when God come to judge righteously on the humanity evil motives, plans and destructions. The Bible records of the seven seals (Revelation 6:1–17; 8:1–5), seven trumpets (Revelation 8:6–9:21; 11:15–19), and seven bowls (Revelation 16:1–21) in the Book of Revelation, which implies ’ God stepping in the History of man and pass judgement on those who hate Israel. The seventh seal introduces the seven trumpets (Revelation 8:1–5), and the seventh trumpet introduces the seven bowls (Revelation 11:15–19; 15:1–8). The seven seals include; the Antichrist (Revelation 6:1–2), great warfare (Revelation 6:3–4), famine (Revelation 6:5–6), plague (Revelation 6:7–8), the martyrdom of believers in Christ (Revelation 6:9–11), a devastating earthquake causing terrible devastation, and astronomical upheaval (Revelation 6:12–14). These catastrophic events will affect the economy and more so the financial market.

The bowl judgments include painful sores afflicting humanity (Revelation 16:2), the death of every living thing in the sea (Revelation 16:3), the turning of rivers to blood (Revelation 16:4–7), an intensifying of the sun’s heat (Revelation 16:8–9), great darkness and an intensification of the sores from the first bowl (Revelation 16:10–11), the advance the Antichrist’s armies at Armageddon (Revelation 16:12–14), and a devastating earthquake followed by giant hailstones (Revelation 16:15–21). More destruction to the economy will require heavy bills for medical cover, recall what happened to Pharaoh of Egypt at the point God stepped in to rescue the Israelis.

The seals + The trumpets + The bowls = The great day of the LORD (Revelation 6:17).

A **trumpet** is a brass instrument commonly used in classical music, but have historically been used as signaling devices in battle or hunting, with examples dating back to at least 1500 BC; they began to be used as musical instruments only in the late 14th or early 15th century (Petrouska.com n.d.).

The First Two Trumpets (Revelation 8:7-9), may have signified, the World War I, that had a large amounts of artillery shells and chemical agents which were released on troops for the first time in history through modern warfare, killing over 8 million people. Soldiers on both sides burned vast tracts of land in order to eliminate any natural or man-made items that their enemies could use. World War II followed, where approximately one third of the ships that participated in the conflict were sunk, plus, the nuclear bomb deployed at Hiroshima that resembled “something like a great mountain burning
with fire,” a sight that was new on the world stage before. These impacted the world economy drastically.

Upon the first trumpet sound, hail and fire, mixed with blood, is thrown to the Earth burning up a third of the trees on the planet, and all green grass. By the second trumpet sounding, it cues something like a great burning mountain that plunges into the sea and wipes out a third of all sea life and ships. A third of the oceans become blood.

The Third Trumpet (Revelation 8:10-11), since 1950s, there has been several incidence of disaster in that the 1986 Chernobyl disaster that occurred in the Ukraine in 1986, has had meaning given to it, that “Chernobyl” means “Wormwood” in Russian. The nuclear radiation that emanated from the destroyed power plant contaminated more than 33 percent of the water supply in Europe and Western Asia, killing thousands and affecting hundreds of thousands of other citizens with diseases caused by the radiation (Baverstockand Williams, 2006).

The Bible states, by the sound of the third trumpet, a great star called Wormwood falls to the Earth poisoning a third of the planet’s freshwater sources, such as rivers and springs. Men will die from drinking its bitter taste.

The Fourth Event (Revelation 8:12-13), which implies that time will be shortened and our days around the world will be experienced differently, the element of the “new world order” with a new age of globalization began to develop, after the Berlin Wall fell in 1989.

Following the sounding of the fourth trumpet, a third of the light that shines from the Sun, moon and stars became dark from these celestial bodies. This catastrophe caused complete darkness for a third of a day, during the day.

The Fifth Instrument (Revelation 9:11), may signify what happened during the Gulf War, Iraqi soldiers ignited over 700 oil wells around the deserts of Kuwait, which were some of the largest, underground wells of oil on the planet. From the seemingly bottomless hole in the ground, smoke entered the atmosphere and blocked sunlight for three months.
The fifth trumpet sound is the first Woe of three. Before this trumpet sounds, an angel appears, flying in mid-heaven, and warns, "Woe, woe, woe, to those who dwell on the earth, because of the remaining blasts of the trumpet of the three angels who are about to sound"

The fifth trumpet prompts a personified star to fall from heaven. The star is given the key to the bottomless pit. After opening it, the smoke that rises out, darkens the air and blocks the sunlight. Then from out of the smoke, the Locusts were unleashed. They were scorpion tailed warhorses, having a man's face with lion's teeth. Their hair was long like that of a woman's and flew with locust-like wings. They were crowned with golden crowns and protected with iron-like breastplates. They were commanded by their king, Abaddon, to torment any man who does not have the seal of God on their forehead, by using their scorpion-like tails. It was also made clear to them that they must not kill anyone during their five-month mission of torment.

**The Sixth Trumpet (Revelation 9:13-21)** indicates that four angels will command an army of 200 million individuals around the waterway, probably the Euphrates River, the waterway that traverses Syria, Iraq, Turkey and Iran, comprise the Middle East.

This is the Second woe, where four angels are released from their binds to the great river Euphrates. They command a brute force of 200 million mounted troops whose horses dissipate plague from out of their mouths, which looks like: fire, smoke, and brimstone. The mounted horsemen wore breastplates with the color of fire, hyacinth, and brimstone. The horses had a lion's head and their tails were like a serpent, even with a snake head. They are responsible for the deaths of a third of mankind who are stricken by the plague that emanated from these armies.

**The Final Trumpet** this will be the most dynamic event out of all the trumpets prophesied in the Bible, affecting all human beings. It is at this last trumpet that Jesus Christ will send angels to rapture all saints for their eternal reward and pass his judgments on the fate of the earth's inhabitants. This event also marks the end of human government and the establishment of the Kingdom of God, on earth, for the next one thousand years.

The sound of the seventh trumpet signals the Third woe. This is the final trumpet sound and the final woe. Loud voices in heaven which said "The kingdom of the world has become the kingdom of our Lord and of his Messiah, and he will reign for ever and ever." Thanks are given to God, the Almighty and praise for the wrath that came, the dead who were judged, and the bond-servants rewarded. "Then God's temple in heaven was opened, and within his temple was seen the ark of his covenant. And there came flashes of lightning, rumblings, peals of thunder, an earthquake and a severe hailstorm."
**IMPACT OF BITCOIN**

The impact on the economy when (not if) it happens, will collapse the economy by some heavy percentage, which will keep on contracting with no one being able to economically remedy as Joseph of Egypt did.

Since countries with rapid credit growth have a risk of a financial crisis and recession, (China’s road to a crisis became irreversible in 2015, the roots of the crisis dating to the 2009 stimulus in the wake of the global financial crisis, two events occurred in 2015 that make it politically impossible for Beijing to now take sufficient corrective action) has started to recognize its credit problem and is addressing it, its responses are too late and too slow to avert a crisis. The main debate should be over when, and not if, a Chinese financial crisis will hit (Joske, 2018). The increasing pace of US rate hikes and fears of a global slowdown are fueling growing concerns over the next financial crisis (Yap, 2018).

**THE MOST PRICELESS ASSET**

Assessing the happenings in the history of the world, then the question may be, is Bitcoin the most priceless asset? Most of us missed out on the opportunity to own a Bitcoin when it was cheap. Is there something we can do?

Since the economies will be affected, the trumpets will introduce terror, the Bitcoins may follow suit on the paper currency. Therefore, the only asset that will hold strong is righteousness.

The beauty about this is that the asset can be attained for free now. During the trumpets times, it will be bought with own blood. Isaiah says come and buy for free. *Isaiah 55:1-5* declares “… Are you penniless? Come anyway—buy and eat! Come, buy your drinks, buy wine and milk. Buy without money—everything’s free! Why do you spend your money on junk food, your hard-earned cash on cotton candy? Listen to me, listen well: Eat only the best fill you with only the finest.”

If you own this particular crypto-currency (righteousness), you will be able to endure whatever will come your way in the run up to the eminent of the 2nd coming of Jesus Christ and you are left behind during the rapture. This crypto-currency will bestow to you eternal life. Righteousness is of Christ...

Righteousness is the garment of Christ, Mathew 22:13 and if you don’t have it, you will be disappointed.
**CONCLUSION**

**Bitcoins the Future of the theory of Demand and Supply: Any hidden agenda?**

There is no hidden agenda in the spread of Bitcoins. Just like no one owns the internet, it seems that; there is nobody who owns the Bitcoins network much like no one owns the technology. Literature has enough updates on this. The challenge is that the end is coming and judgment will soon be here.

**THE RIGHTEOUSNESS**

The aim of this paper is not to show you how to become rich by owning Bitcoin, or the technology aspect of Bitcoins, but to help understand what the Bible state in 2 Thessalonian 2, “let’s continue doing what we are about to, but be sensitive that all these things will come to a standstill one of these fine days”. Righteousness describes conduct in relation to others, especially with regards to the rights of others in business, in legal matters, and beginning with relationship to God as opposed to evil and wickedness. The Bible describes the righteousness of a person as just or right, holding to God and trusting in Him Psalm 33:18–22. Righteousness is attainable for mankind, through the cleansing of sin by Jesus Christ and the indwelling of the Holy Spirit. 2 Corinthians 5:21.

Toon, (1996), declares that, God the Father is righteous (just); Jesus Christ his Son is the Righteous (Just) One; the Father through the Son and in the Spirit gives the gift of righteousness (justice) to repentant sinners for salvation; such believing sinners are declared righteous (just) by the Father through the Son, are made righteous (just) by the Holy Spirit working in them, and will be wholly righteous (just) in the age to come. Toon, (1996) states that, righteousness stem from the Greek words based on the stem dikai- into English we make use of two sets of words based on the stems, just and right. So we have just, justice, justify and right, righteous, righteousness, rightwise (old English). Hosea, the prophet of divine love, ties righteousness with mercy, loving kindness, and justice (2:19; 10:12). God’s righteousness is, for Paul, God’s saving activity in and through the life, death, and resurrection of Jesus Christ, his Son (Romans 10:6; Philipian 3:9).

As this period approach and become a reality, God will personally protect the righteous. When the trumpets are sounded, God commands that the righteous not to be touched. These will be those that hold the crypto-currency of righteousness. The crises of Ages are almost here, just look at the evil in the world, and strive to acquire the crypto-currency of RIGHTEOUSNESS.
By no means am I demeaning to acquisition of Bitcoins, I am saying, the better one is Righteousness. Pursue all and acquire, but pursue righteousness more for it will outlast Bitcoin. Bitcoins will only outlast paper currency and will fall short of the crypto-currency of righteousness.

REFERENCE.


Appendix: Data summary

<table>
<thead>
<tr>
<th>Year</th>
<th>Incident</th>
<th>INES level</th>
<th>Country</th>
<th>IAEA description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>Fukushima</td>
<td>5</td>
<td>Japan</td>
<td>Reactor shutdown after the 2011 Sendai earthquake and tsunami; failure of emergency cooling caused an explosion</td>
</tr>
<tr>
<td>2011</td>
<td>Onagawa</td>
<td></td>
<td>Japan</td>
<td>Reactor shutdown after the 2011 Sendai earthquake and tsunami caused a fire</td>
</tr>
<tr>
<td>2006</td>
<td>Fleurus</td>
<td>4</td>
<td>Belgium</td>
<td>Severe health effects for a worker at a commercial irradiation facility as a result of high doses of radiation</td>
</tr>
<tr>
<td>2006</td>
<td>Forsmark</td>
<td>2</td>
<td>Sweden</td>
<td>Degraded safety functions for common cause failure in the emergency power supply system at nuclear power plant</td>
</tr>
<tr>
<td>2006</td>
<td>Erwin</td>
<td></td>
<td>US</td>
<td>Thirty-five litres of a highly enriched uranium solution leaked during transfer</td>
</tr>
<tr>
<td>2005</td>
<td>Sellafield</td>
<td>3</td>
<td>UK</td>
<td>Release of large quantity of radioactive material, contained within the installation</td>
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<tr>
<td>Year</td>
<td>Incident</td>
<td>INES level</td>
<td>Country</td>
<td>IAEA description</td>
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<td>------</td>
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<td>--------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>2005</td>
<td>Atucha</td>
<td>2</td>
<td>Argentina</td>
<td>Overexposure of a worker at a power reactor exceeding the annual limit</td>
</tr>
<tr>
<td>2005</td>
<td>Braidwood</td>
<td>US</td>
<td>US</td>
<td>Nuclear material leak</td>
</tr>
<tr>
<td>2003</td>
<td>Paks</td>
<td>3</td>
<td>Hungary</td>
<td>Partially spent fuel rods undergoing cleaning in a tank of heavy water ruptured and spilled fuel pellets</td>
</tr>
<tr>
<td>1999</td>
<td>Tokaimura</td>
<td>4</td>
<td>Japan</td>
<td>Fatal overexposures of workers following a criticality event at a nuclear facility</td>
</tr>
<tr>
<td>1999</td>
<td>Yanangio</td>
<td>3</td>
<td>Peru</td>
<td>Incident with radiography source resulting in severe radiation burns</td>
</tr>
<tr>
<td>1999</td>
<td>Ikitelli</td>
<td>3</td>
<td>Turkey</td>
<td>Loss of a highly radioactive Co-60 source</td>
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<tr>
<td>1999</td>
<td>Ishikawa</td>
<td>2</td>
<td>Japan</td>
<td>Control rod malfunction</td>
</tr>
<tr>
<td>1993</td>
<td>Tomsk</td>
<td>4</td>
<td>Russia</td>
<td>Pressure buildup led to an explosive mechanical failure</td>
</tr>
<tr>
<td>1993</td>
<td>Cadarache</td>
<td>2</td>
<td>France</td>
<td>Spread of contamination to an area not expected by design</td>
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<tr>
<td>1989</td>
<td>Vandellos</td>
<td>3</td>
<td>Spain</td>
<td>Near accident caused by fire resulting in loss of safety systems at the nuclear power station</td>
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<tr>
<td>1989</td>
<td>Greifswald</td>
<td></td>
<td>Germany</td>
<td>Excessive heating which damaged ten fuel rods</td>
</tr>
<tr>
<td>1986</td>
<td>Chernobyl</td>
<td>7</td>
<td>Ukraine (USSR)</td>
<td>Widespread health and environmental effects. External release of a significant fraction of reactor core inventory</td>
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<td>1986</td>
<td>Hamm-Uentrop</td>
<td></td>
<td>Germany</td>
<td>Spherical fuel pebble became lodged in the pipe used to deliver fuel elements to the reactor</td>
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<tr>
<td>1981</td>
<td>Tsuraga</td>
<td>2</td>
<td>Japan</td>
<td>More than 100 workers were exposed to doses of up to 155 millirem per day radiation</td>
</tr>
<tr>
<td>1980</td>
<td>Saint Laurent des Eaux</td>
<td>4</td>
<td>France</td>
<td>Melting of one channel of fuel in the reactor with no release outside the site</td>
</tr>
<tr>
<td>Year</td>
<td>Incident</td>
<td>INES level</td>
<td>Country</td>
<td>IAEA description</td>
</tr>
<tr>
<td>------</td>
<td>---------------------------</td>
<td>------------</td>
<td>----------------</td>
<td>---------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1979</td>
<td>Three Mile Island</td>
<td>5</td>
<td>US</td>
<td>Severe damage to the reactor core</td>
</tr>
<tr>
<td>1977</td>
<td>Jaslovské Bohunice</td>
<td>4</td>
<td>Czechoslovakia</td>
<td>Damaged fuel integrity, extensive corrosion damage of fuel cladding and release of radioactivity</td>
</tr>
<tr>
<td>1969</td>
<td>Lucens</td>
<td></td>
<td>Switzerland</td>
<td>Total loss of coolant led to a power excursion and explosion of experimental reactor</td>
</tr>
<tr>
<td>1967</td>
<td>Chapelcross</td>
<td></td>
<td>UK</td>
<td>Graphite debris partially blocked a fuel channel causing a fuel element to melt and catch fire</td>
</tr>
<tr>
<td>1966</td>
<td>Monroe</td>
<td></td>
<td>US</td>
<td>Sodium cooling system malfunction</td>
</tr>
<tr>
<td>1964</td>
<td>Charlestown</td>
<td></td>
<td>US</td>
<td>Error by a worker at a United Nuclear Corporation fuel facility led to an accidental criticality</td>
</tr>
<tr>
<td>1959</td>
<td>Santa Susana Field Laboratory</td>
<td></td>
<td>US</td>
<td>Partial core meltdown</td>
</tr>
<tr>
<td>1958</td>
<td>Chalk River</td>
<td></td>
<td>Canada</td>
<td>Due to inadequate cooling a damaged uranium fuel rod caught fire and was torn in two</td>
</tr>
<tr>
<td>1958</td>
<td>Vinča</td>
<td></td>
<td>Yugoslavia</td>
<td>During a subcritical counting experiment a power buildup went undetected - six scientists received high doses</td>
</tr>
<tr>
<td>1957</td>
<td>Kyshtym</td>
<td>6</td>
<td>Russia</td>
<td>Significant release of radioactive material to the environment from explosion of a high activity waste tank.</td>
</tr>
<tr>
<td>1957</td>
<td>Windscale Pile</td>
<td>5</td>
<td>UK</td>
<td>Release of radioactive material to the environment following a fire in a reactor core</td>
</tr>
<tr>
<td>1952</td>
<td>Chalk River</td>
<td>5</td>
<td>Canada</td>
<td>A reactor shutoff rod failure, combined with several operator errors, led to a major power excursion of more than double the reactor’s rated output at AECL’s NRX reactor</td>
</tr>
</tbody>
</table>