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Buried Waste Samples Indicate Potential Criticality Hazard

An internal DOE sampling report on radioactive waste buried in INEEL's Pit-9 in showed problems here- to-for not considered. This July 2000 report, one probe hit a single buried barrel with up to 1000 grams of plutonium-239. [i] Criticality is considered an extreme risk when any given barrel contains more than 267 grams of plutonium-239 or 400 grams enriched uranium-235. This criticality hazard is not being made public by the DOE. Since there were only 20 probe samples taken at Pit-9, the regulatory agencies requested that eight additional probe samples be taken to determine the extent of the criticality hazard. If numerous barrels with up to 1000 grams of plutonium or uranium are co-located in the waste pit, one barrel going critical could set up cascading self-sustained criticalities in nearby barrels. To put the quantity of plutonium required for criticality into perspective, waste acceptance criteria for the Waste Isolation Piolet Project (WIPP) limits the plutonium or enriched uranium concentration to 200 grams per barrel.

Criticality is a nuclear situation where sufficient quantities of fissile materials like plutonium and/or uranium are in a "geometry" or close proximity where a self-sustained chain reaction occurs. This process is designed to occur in a nuclear reactor core. However, when a criticality occurs in uncontrolled situations like reactor fuel reprocessing or waste dumps, it is a major accident resulting in serious radiation exposure to workers, and releases to the atmosphere. It must be noted that a criticality is not the same as a bomb exploding. A criticality will produce a thermal surge, fire, and enormous radiation release, but no explosion unless there are flammable solvents involved in the fire, a possible accident scenario.

Despite these newly disclosed hazards posed by the buried waste at INEEL, DOE refuses to spend the $10 million dollars promised during the Remedial Investigation/Feasibility Study of the dump site. This funding was to conduct core sampling of other pits and trenches suspected of having high concentrations of plutonium and uranium transuranic waste in them. Specific pits identified as having significant TRU waste are Pits No. 4, 5, 6, 9, and 10. It is nothing less than wishful thinking to believe that only these five Pits contain TRU waste with a criticality hazard. Other DOE internal reports show 12 pits and 15 trenches and over a thousand soil vaults with TRU waste. [ii]

Conservatives managed to convince a majority of Congress that the federal government could not manage construction of new radioactive waste treatment plants, and therefore launched a massive new privatization program. Billions of dollars in contracts were awarded to private contractors to design, build, and operate these new facilities. One contract went to Lockheed Martin in the early 1990's to dig up and treat the transuranic waste buried in Pit-9 at the INEEL

dump site. Everyone including DOE now agree that the Lockheed Martin Pit-9 contract is a complete failure for reasons ranging from inadequate management control to inadequate information on how "hot" the waste to be treated was.

DOE Pit-9 debacle is a clear example of how unreliable the estimates of how much radioactivity was dumped at INEEL. The Pit-9 plant was designed based on these inadequate estimates of how much radiation would be encountered when the waste was exhumed and processed. After the plant construction was nearly half completed, Lockheed Martin started doing additional sampling of the buried waste and found much higher activity levels than anticipated. The Pit-9 plant radiation shielding design was inadequate to protect workers from both the waste extraction part and the treatment part of the operation. Consequently, the whole project was shut down, and DOE and the contractor are currently locked in a legal battle over who is responsible.

Prior to 1973, all waste shipped to INEEL for burial was simply dumped directly from the truck into the pit or trench that was open at the time. Normally, only one pit or trench was open at any given time; no sorting or reassessment of what was in the barrels or boxes was made. Nuclear waste shippers like the Rocky Flats Plant (RFP) in Colorado knew there would be no reassessment of what was listed on the shipping manifest so there was no incentive to do thorough characterization prior to shipment. [iii] This twenty year period of sloppy shipping and dumping practice between 1950 and 1973 also resulted in dangerous quantities of plutonium (enough to threaten a criticality) being put in individual barrels. The recent Pit-9 core sampling that found up to 1000 grams of plutonium in a single barrel proves the point.

Although, DOE is not publically acknowledging the fact, its internal reports show the buried waste contains 11,000,000 curies [iv] of radioactivity including 1,455 kilograms of plutonium from Rocky Flats alone. [v] The total buried plutonium (2,160 kg) from both Rocky Flats and other sources, contains 700,400 curies of radioactivity.[vi] These totals are now known to be grossly understated due to recent revelations about Rocky Flats plutonium waste shipments to INEEL.

The radioactivity in the INEEL buried waste cited above is still significantly understated because it relies on original generator's shipping manifest records that are now known to be understated. There were no checks at the INEEL dump to confirm the accuracy of the manifests because these were shipments between DOE facilities.

These discrepancies were revealed only in the last few years when DOE was forced to disclose where all its nuclear bomb material is located and give precise inventories. Rocky Flats Plant (largest plutonium waste shipper to INEEL) conducted a physical inventory of plutonium, compared it to the book inventory, and determined that 1,191.8 kg of plutonium was unaccounted.[vii] Part of this shortfall was attributed to an estimated 20% in the duct-work and glove boxes, and the remaining 80% shortfall was shipped to INEEL for disposal but was not included in the shipping manifests. 80% of the total unaccounted for Rocky Flats Pu -- that is, up to 953 kg-- went to INEEL. [viii]

Critics note this 20/80 % split is unlikely because if there was still that much plutonium in the duct-work at Rocky Flats, there would be many more criticality fires. Little or no waste characterization occurred at INEEL on shipments to the burial grounds. What records that were kept only reflect what the generator reported at the time of shipment as container contents.

So how much plutonium is dumped in Idaho? If the unreported Rocky Flats plutonium shortfall shipped to INEEL (953 kg) is added to what DOE previously thought was in the Subsurface Disposal Area (2,160 kg) from Rocky Flats and other sources, it adds up to 3,113 kg in the SDA from all sources. Since only 3 to 4 kg go into a nuclear warhead, this is enough for hundreds of nuclear bombs. [ix]

What Else is Dumped at INEEL That is a Threat

In June of 2000 the Department of Energy (DOE) released a report that claims to resolve "previous inaccuracies and inconsistencies " concerning the amount of buried transuranic radioactive waste at the major DOE nuclear sites. Transuranic waste contains long-lived radioactive elements heavier than uranium such as plutonium and americium. INEEL ranks at the top of the list for having the most buried transuranic waste, actually, 85 % of the national total. This new report attributes INEEL with 36,800 cubic meters (cm) of Transuranic (TRU) buried waste with a reported 634,000 curies of radioactivity at the time it was dumped and a decayed curie content of 297,000 curies in the year 2006. [x] Decay correction is the amount by which the radioactivity of a substance must be reduced after a period of time to account for its radioactive decay during that time.

Environmental Defense Institute researchers consider these new estimates to still be grossly understated, inaccurate and inconsistent. DOE's report also fails to acknowledge over 90 metric tons of irradiated reactor fuel dumped in the INEEL burial ground. Additionally, the report fails to acknowledge the fact that the INEEL dump site is in a forty foot deep localized depression and in the flood plain of the Big Lost River. Radionuclides and hazardous chemicals have already migrated to the underlying Snake River Aquifer.

A Comprehensive Inventory Report generated by DOE in 1994 on waste buried at INEEL, generally considered one of the more thorough waste characterization studies in the DOE Complex, attributes TRU waste dumped at some 920,710 curies. Americium-241 (220,00) and Plutonium species (700,400) curies are the main components to the count. [xi] As discussed above, the Rocky Flats information used in this report was collected in 1993 before the revelations about the DOE Complex wide nuclear weapons grade plutonium inventory shortfalls were released to the public in 1996. The Rocky Flats Plant (RFP) acknowledged that nearly a ton (953 kg) of weapons grade plutonium-239 was unaccounted for and RFP officials attributed the shortfall to unrecorded waste shipments to INEEL. Assuming Pu-239 contains 0.063 curies per gram, this additional unrecorded plutonium could increase the radioactivity content of TRU dumped at INEEL by about 60,000 curies. This would bring the estimated radioactivity total of TRU waste dumped at INEEL to 980,710 curies. This represents about 65% more than DOE's recent estimate of 634,000 curies.

DOE again failed to include over 90 metric tons of high-level irradiated reactor fuel in its INEEL buried waste inventory. These numbers, compiled by the Environmental Defense Institute, are drawn from DOE's Database and represent about 57 shipments specifically identified as "irradiated fuel". [xii] Not included in this count are even more numerous shipments called "unirradiated fuel", "fuel rods", "control rods", and other reactor fuel not identified specifically as "irradiated". The curie content of these shipments identified as "fuel rods" (>7,000 curies) suggests that they are also irradiated reactor fuel.

Equally significant are spent nuclear fuel related waste shipments to the INEEL dump. This waste includes spent nuclear fuel parts cut off the fuel elements prior to storage and fuel storage "canal trash" that alone represents over **9,866,112 curies.** The burial grounds are a shallow disposal area that would not meet municipal garbage landfill regulations.

More INEEL Documents Destroyed

The Centers for Disease Control (CDC) contractor Risk Assessment Corp (RAC). conducting document review for the INEEL Dose Reconstruction Health Study recently revealed that document destruction related to the study is significantly higher than previously acknowledged. Dr. John Till, President of RAC completed the lengthy multi-year review of relevant information needed to quantify how much radiation was released over INEEL's operating history and submitted his findings to CDC.

The startling finding Till reports is that some 1,254 boxes of documents containing potentially some 6 million pages of information was destroyed before it could be used in CDC's INEEL health study. RAC assigned a ranking system (pertinence 1, 2, 3, and 9) to boxes of documents; pertinence 1 & 2 being the most important and pertinence 9 being not important. Recalled boxes "means the box was permanently recalled by someone at INEEL and it is no longer at the specified location." Unable to locate boxes "means that after several tries, we [RAC] have not been able to find the box." The breakdown is as follows:

Pert 1 & 2.....584 boxes
Pert 3.....500 boxes
Recalled.....72 boxes
Unable to locate...98 boxes
Total.....1,254 boxes

This destruction of evidence that could document DOE's impact on the health and safety of workers and residents living downwind of INEEL represents a scandal of enormous proportions. DOE was told definitively in a 1990 Memorandum of Understanding with the US Department of Health and Human Services (which CDC is a division of) that documents related to DOE site health studies are to be preserved.

Estimating INEEL Radioactive Releases

The INEEL Health Effects Sub-committee (IHES) issued a recommendation to the Centers for Disease Control (CDC) to conduct a source term review of the INEEL RaLa Runs. At the last IHES meeting in June CDC officials indicated that they were moving forward with a RaLa Review and offered an outline of the methodology CDC intended to implement. Specifically, CDC intends to utilize DOE's stack monitoring data to quantify the source terms (what contaminates were released, how much was released and when they were released). Before launching into a discussion on this INEEL process, it is useful to review the Hanford Environmental Dose Reconstruction (HEDR) process and identify lessons learned by the public.

HEDR Source Terms

Numerous major mistakes were made and continue to be made by CDC in the HEDR process to establish radiation doses to the effected public from the emissions from Hanford. Since HEDR started some six years before the INEEL Dose Reconstruction Study, there are lessons to be learned so as to avoid repeating the same mistakes at INEEL and further undermining CDC credibility and wasting tens of millions of dollars of public resources.

Initially, HEDR's focus was on Hanford's startup of its plutonium processing plants in 1944 through 1947. This period is generally called the "Green Runs" because Hanford was processing fuel shortly after it was removed from the reactor and before it cooled in water pools allowing short-lived fission products like Iodine-131 to decay. HEDR estimated in the late 1980's that approximately 441,700 curies of I-131 was released between 1944 and 1947. This estimate was based on declassified stack monitoring documents released in a Freedom of Information Act request. Few people outside DOE and CDC believed these estimates because they were based on questionable data. Finally, years later, after significant public pressure, CDC sponsored a physical reconstruction of the Green Run period between 1944 and 1947. The 1992 revised estimate increased to 685,000 curies of I-131 released between 1944 and 1947. The key elements of the data needed for a physical reconstruction were:

1.) Cooling time of the fuel processed. Short cooling periods of hours or days rather than months means that short-lived isotope inventories such as I-131 will be much higher in the fuel.
2.) Release fractions. This figure is based on how much of the iodine present in the fuel is released to the environment. For Iodine-131, HEDR calculated the release fraction to be 90.5%.
3.) Reactor power levels of fuel used. A direct relationship exists between the reactor power level and the isotopes created in the fuel. The higher the power level, the more Iodine-131 is generated. [TSP News letter, 12/92]
4.) Fuel type and percentage U-235/Pu-239 enrichment.
5.) Emission control systems accurately factored through the chronological history of the plant.

The partial physical reconstruction (1944 to 1947) was not extended to the 1948 to 1960 period, though HEDR estimates Iodine-131 releases between 1944 to 1960 at about 738,700 curies which produced a 870 rad exposure to an infant born in Ringold, WA in 1943 or 1944. [Connections(a)]

While working on the Hanford Downwinders class-action lawsuit, Owen Hoffman, President of the SENES Oak Ridge Center for Risk analysis, determined that approximately 900,000 curies of Iodine-131 were released by the AEC's Hanford plants between 1944 and 1957, a period including the Hanford "Green Runs." This amount is 150,000 curies more than the "official" estimates from the Centers for Disease Control. Hoffman's review focused primarily on the period between 1951 and 1960 because HEDR did not extend the thorough physical reconstruction into this period. He concludes that "the estimates of releases presented...for this period clearly represent severe underestimates of the actual releases."[xiii] Hoffman also notes that HEDR attempted to attribute emission control systems to processing plants many years before they were installed, thus underestimating the releases. This chronological error was also made with CDC's INEEL Phase-1 Report generated by Sanford Cohen & Associates despite protests by this author, and no attempt has yet been made to correct the errors.

INEEL RaLa Run Review

As of this writing, CDC apparently refuses to do a physical reconstruction of the INEEL RaLa Runs as part of the INEEL Dose Reconstruction Health Study. CDC is opting for the use of discredited DOE stack monitoring data. This is another deliberate attempt by CDC to understate the radiation release estimates in the hope that the government's liability exposure will be minimized. There are extremely important "lessons learned" from the Hanford studies that the public justifiably wants applied to the INEEL studies.

Documents relating to Hanford production reactors gained by the Environmental Defense Institute through Freedom of Information Act (FOIA) requests shows the elaborate logistical arrangement required for the RaLa Runs at the ICPP. "The short half-life of the RaLa product has important effects on RaLa procedure. Due to its rapid decay rate, Ba-140 concentration approaches saturation in "green metal" soon after the metal is charged in the reactor. For this reason metal shipped as RaLa is normally "green" metal charged on the last outage previous to the RaLa shipment. Due to the short half life of the RaLa product, rapid handling and processing of the discharged material is imperative. Once a reactor is shutdown and metal is discharged for the RaLa program, this material must be shipped, processed, and forwarded to its destination as quickly as possible so as to minimize product depletion due to decay. For the same reason, the dates and times of the RaLa shutdowns are routinely adjusted to shipping schedules." [xiv]

Other Hanford documents quantify the amount of irradiated uranium slugs shipped to ICPP. For instance one report notes that between 11/54 and 4/56 200,000 J and C Slugs were shipped from Hanford to ICPP for processing.[xv] Other reports put the shipping rates at 22 kilograms per month.[xvi] The point in emphasizing in this discussion the extensive involvement

of the Hanford reactors in providing ICPP throughput, is to demonstrate the importance of this information in developing ICPP source terms via a physical reconstruction. To date, CDC is not showing any interest in utilizing this crucial information.

Both INEEL and Hanford were reprocessing green reactor fuel using sodium hydroxide as a "caustic" to dissolve the fuel and chemically separate the uranium and plutonium. In the case of the INEEL RaLa Runs, lanthanum-140 or its decay product barium-140 was the production focus. At both sites there was little or no emission control systems in place to filter out the fission products like I-131 released to the atmosphere. "During this time, there no filters on the stacks of the separations plants. Radioactive materials in the form of gases, vapor, and particles went up the stacks. The separations process primarily released large amounts of iodine-131, ruthenium-106 and ruthenium-103 along with other radioactive substances. Two radioactive gases emitted in the separations process, krypton-85 and xenon-133, contribute to radiation dose of a person stands in a 'cloud' of the gases. Plutonium is also known to have traveled off-site." [xvii]

Because these other isotopes (besides I-131) contribute significantly to the dose, they must be included in the INEEL source terms at the Idaho Chemical Processing Plant (ICPP) now called INTEC. The RaLa Runs must also **NOT** be the sole focus of ICPP source terms, but rather one of many separations campaigns. Therefore, the entire ICPP throughput must be subjected to a full physical reconstruction. Just as important, is the high-level liquid waste Calciner incinerator and other high-level waste evaporators must be included in the ICPP source terms. The first Waste Calcine Facility came on line in 1963 and ran through 1981 incinerating more than 4 million gallons of high-level waste. The New Waste Calcine Facility (NWCF) operated between 1982 and 2000 incinerating an additional 4 million gallons of high-level liquid waste.[xviii] Both Calciners never received the required RCRA hazardous waste permits because they could not meet emission standards.

Again, ICPP stack monitoring data is unreliable and must not be used in source term estimation. To further illustrate this point, Environmental Defense Institute, Keep Yellowstone Nuclear Free, and David McCoy have copies of internal INEEL reports gained through a Public Information Request, that acknowledge as late as 1996 that the required ICPP stack monitors were either non-existent or were turned off. This document further acknowledges that DOE is in violation of the Clean Air Act (NESHAP) regulations. [xix] DOE generates emission release documents based largely on "process knowledge" estimates, not on actual instrument monitoring data and is therefore unreliable not to mention illegal.

CDC is defending its resistance to a full physical reconstruction at INEEL, by characterizing it as only a "screening" process to determine if the RaLa Runs deserve additional study. CDC, in the past, forgot that "screening reviews " were quick and dirty reviews and later called them credible source terms studies in the hopes that no one remembers the applied methodology. The public demands credible science from CDC, and the agency must understand that we will not suffer through the same bogus process demonstrated at Hanford.

CDC's INEEL Document Data Base

CDC's Phase-I document data base and the more recent RAC Task Order 6 database posted on the agency website was randomly checked for Hanford documents related to the INEEL RaLa Runs and other ICPP fuel reprocessing. None were found using the website search engine. Even Dr. Till's instructions to look for MC- 71617 and MC-71618 documents, the search came up empty. This is yet another indication that information base for the INEEL Dose Reconstruction Study remains deficient.

The issue of INEEL document destruction is at the crisis point. The recently released CDC status report on documents relevant to the INEEL Dose Reconstruction Study reveals that some 1,254 boxes of documents have been destroyed or are otherwise missing. A single box could hold 5,000 pages, so the total loss of information could be in excess of 6 million pages. One of the issues is the CDC's document classification system of Pertinence 1, 2, 3, and 9 in descending order of relative importance to the INEEL Dose Reconstruction Study. To illustrate the problem, let us use the example of the previously discussed need for a physical reconstruction of ICPP source terms. Since CDC never intended to do a physical reconstruction of the ICPP, documents related to reactor power level, cooling time, emission control systems would not be considered a high priority (pertinence 1 or 2) document. CDC's delays of over eight years to conclude its Phase -1 document review has given DOE ample opportunity to destroy incriminating evidence. The problem is so acute, that it is uncertain that a credible study can be done even if CDC suddenly found the political will to do good science. The same problem will be faced by independent researchers working on a future INEEL class action suit, because the essential information simply may no longer exist. CDC additionally failed to secure documents once identified so that they would be later available for use in the health study. That is like farmer Brown telling the fox which chickens are the fat ones and which roost they are on before turning over the keys to the fox to guard the chicken coop.

Endnotes:

[i] *Subsurface Treatability Study Report,* July 2000, INEEL/EXT-2000-0040-3

[ii] EGG-WM-10903, page 2-7

[iii] Subsurface Disposal Area Source Term Characterization Interview Summarization, 1993, Engineering Design File ER-Wag-7-35

[iv] A Comprehensive Inventory of Radiological and Non-radiological Contaminates in the Waste Buried in the Subsurface Disposal Area of the INEL RWMC During the Years 1952-1983, Volume 1, Idaho National Engineering Laboratory, EG&G Idaho, Inc., June 1994, page 6-25, herein after referred to as EGG-WM-10903.

[v] EGG-WM-10903, page 2-76 and C-5 Table C-1.

[vi] EGG-WM-10903, page xxix, Table S-2.

[vii] Openness Press Conference Fact Sheets, February 6, 1996, U.S. Department of Energy, page 65. In 1996, then DOE Secretary O'Leary revealed that 1,191.8 kg of Plutonium could not be accounted for at Rocky Flats. An August 1994 internal Rocky Flats report called "A Discussion of Inventory Difference, Its Origin and Effect," by N. J. Roberts says 200 to 300 kg of the unaccounted Plutonium (Pu) may be in holdup (in piping, duct-work, equipment and the like). Roberts thought Pu contained in waste sent to INEEL may have been understated by 600 to 800 kg. On Feb 21, 1996, then Rocky Flats DOE manager Mark Silverman said that up to 80% of the total unaccounted for Rocky Flats Pu -- that is, up to 953 kg-- went to INEEL.

[viii] Missing Flats plutonium in Idaho, Manager says. Boulder Camera February 22, 1996, Chris Roberts staff writer. "As much as 80 percent of the missing 1.2 tons of plutonium at the Rocky Flats plant may never be found, plant manager Mark Silverman said Wednesday." "The majority is in Idaho, buried in trenches " Silverman said. "We'll never know for sure unless we go back in and dig it up." "The material in Idaho was buried years ago, and new, more accurate measuring technology indicates there may be more buried at the Idaho National Energy Laboratory than records indicate. Most of Rocky Flats plutonium waste was shipped by rail to INEL before 1989 when the former nuclear weapons plant south of Boulder stopped production." Eighty percent of 1.2 tons (1,191 kg) equals 953 kg.

Also See: "A Discussion of Inventory Difference, Its Origin and Effect," Compiled for the Nuclear Material Safeguards Department by N.J. Roberts, et al. EG&G, Rocky Flats Inc. Safeguards and Security Program Support, Revision 4 August 1994. This reports notes on page 9 the waste shipped to INEL was understated by 600 to 800 kg between 1953 and 1971. The remaining inventory difference of 200 to 300 kg was in process equipment holdup at page 10.

Also see:

Pakert/Giacomini Draft, Rev 1 12/6/93 "Questions and answers Possibly arising from the Inventory Difference at Rocky Flats" Department of Energy Rocky Flats Operations Office. This report notes at page 3 that not more than one-third of the inventory difference is in process holdup.

[ix] EGG-WM-10903, page 6-13. INEEL's original (understated) records show that 1,455 kg of all plutonium species containing 470,900 curies from Rocky Flats alone was dumped at INEEL. Therefore, the total Rocky Flats plutonium dumped in the INEEL Subsurface Disposal Area could be as much as 2,408 kg (1,455 kg originally reported + 953 kg unreported RF shortfall). If the unreported Rocky Flats plutonium shortfall shipped to INEEL (953 kg) is added to what DOE previously thought was in the Subsurface Disposal Area (2,160 kg) from Rocky Flats and other sources, it adds up to 3,113 kg in the SDA from all sources.

[x] *Buried Transuranic - Contaminated Waste Information for US Department of Energy Facilities* , June 2000

[xi] *A Comprehensive Inventory of Radiological and Non-radiological Contaminants in the Waste Buried in the Subsurface Disposal Area of the INEL [sic] RWMC During the Years 1952 - 1983*" June 1994, page xxix, herein after called EGG-WM-10903

[xii] Department of Energy Idaho National Engineering and Environmental Laboratory's Radioactive Waste Management Information System Database (P61SH090, and P61SH070, Run Date 10/24/89)

[xiii] Hoffman, F. Owen, *Evaluation of the HEDR Source Term and HTDS Power Calculations*, SENES Oak Ridge Inc., Center for Risk Analysis, March 1999. Also see email from Hoffman to Broscious 9/6/00. Hoffman adds, stack monitoring data can be fraught with uncertainty, especially if the samplers are inefficient and not isokinetic. I agree, the releases should best be based on process level modeling followed by environmental sampling of I-129 (to confirm the release fractions). Was RaLa the only source of I-131 releases at INEEL? At Oak Ridge it may not have been. I now think that the total releases of I-131 were underestimated at Oak Ridge. At INEEL, the public health implications of exposure to releases of I-131 must consider the combined exposures to I-131 in Nevada Test Site and global fallout as well. In fact, worker exposures and risks should be considered along with those residing offsite.

[xiv] Scheduling RaLa Shipments, July 30, 1954, General Electric Company, Hanford Atomic Products Operation. HW-32594, HAN-56557

[xv] See HAN 53823

[xvi] See HAN -52865

[xvii] Hanford Health Information Network, *The Release of Radioactive Materials from Hanford: 1944- 1972*, April 1993

[xviii] Idaho High-Level Waste and Facilities Disposition Draft Environmental Impact Statement December 1999, Vol. 4, C.9-11.

[xix] DOE Notegram, July 25, 1996, to C. L. Tellez, from M. E. Feldman and T. A. Solle, Subject "Air " Legacy Issues Goldfield, Joe, INEEL Advanced Mixed Waste Treatment Plant, January 26, 2000, page 1.