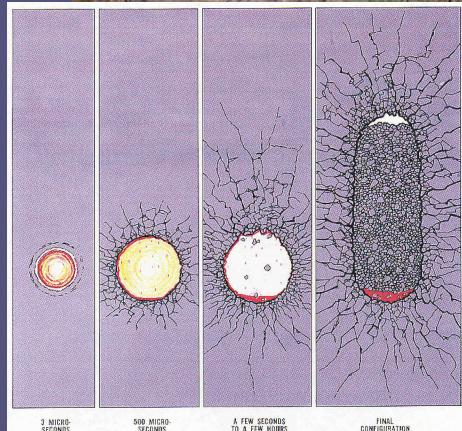
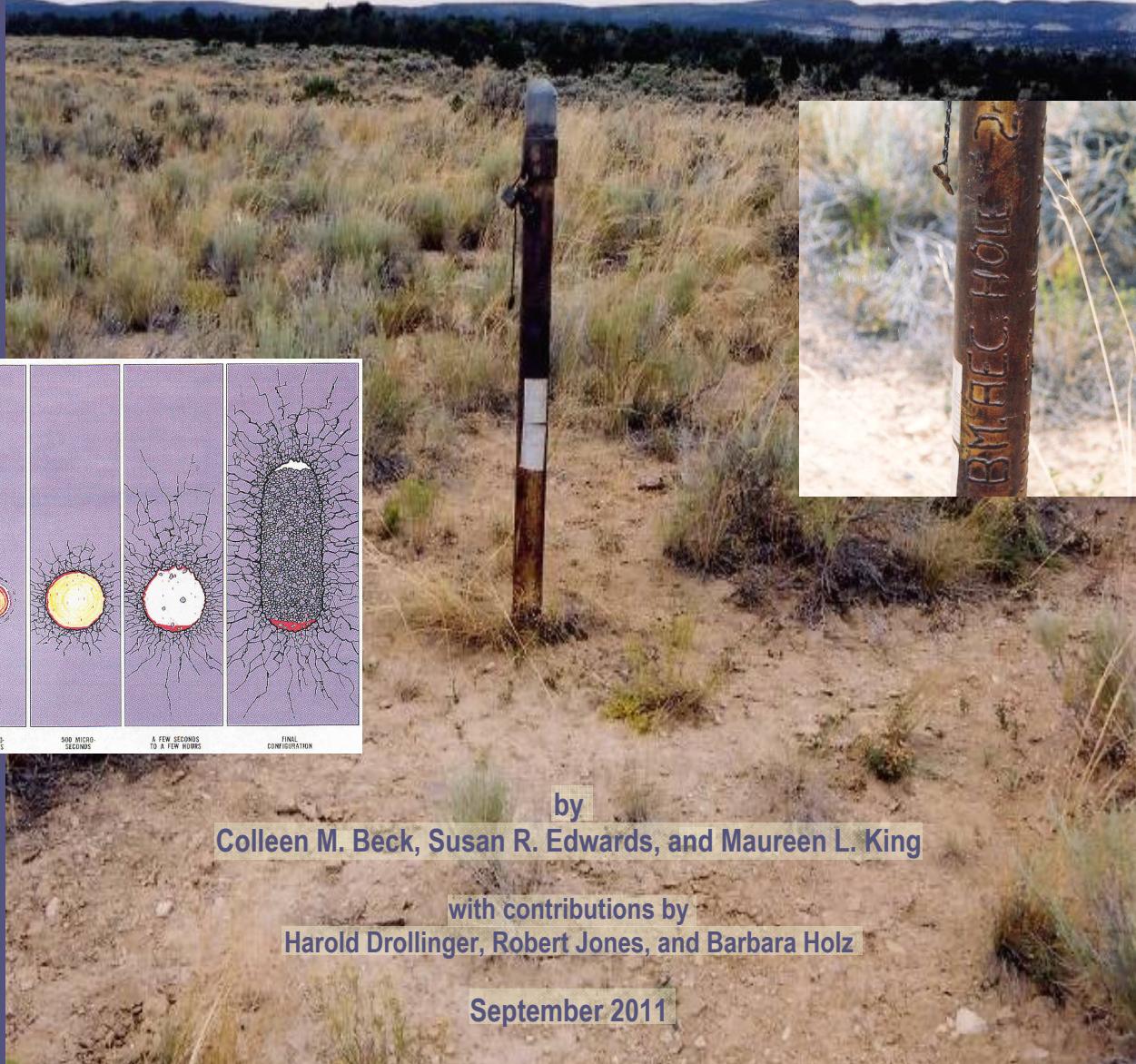




CULTURAL RESOURCES TECHNICAL REPORT NO. 111
DIVISION OF EARTH AND ECOSYSTEM SCIENCES
DESERT RESEARCH INSTITUTE
LAS VEGAS, NEVADA

THE OFF-SITE PLOWSHARE AND VELA UNIFORM PROGRAMS:
*Assessing Potential Environmental Liabilities through an Examination
of Proposed Nuclear Projects, High Explosive Experiments,
and High Explosive Construction Activities*

VOLUME 3 of 3



by
Colleen M. Beck, Susan R. Edwards, and Maureen L. King

with contributions by
Harold Drollinger, Robert Jones, and Barbara Holz

September 2011

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Cover Illustrations: The Project Bronco Site in northwestern Colorado and a schematic of a nuclear explosive-created rubble chimney. Bronco was a planned but never executed Plowshare project designed for the application of nuclear explosives to fracture underground oil shale deposits for in situ retorting and recovery (Photos by C. Beck, July 2005; Graphic from Lekas et al 1967, Figure 3).

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Prepared for

**U.S. Department of Energy
National Nuclear Security Administration
Nevada Site Office, Las Vegas, Nevada**

**Cultural Resources Technical Report No. 111
Division of Earth and Ecosystem Sciences
Desert Research Institute
Las Vegas, Nevada**

September 2011

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APPENDIX A

PROJECT DATA SUMMARIES

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APPENDIX A: PROJECT DATA SUMMARIES

The Project Data Summaries provide a brief overview of important basic facts for each of the 74 projects discussed in Chapters 3 and 4 and are presented in alphabetical order by title of the project. These summaries were designed to meet data quality objectives for project information considered crucial to understanding and evaluating the potential liability of project activities. These summaries were used during the course of the research to track project information as it was acquired to determine data needs. There are nine data categories called characteristics on the project summaries: 1) the project purpose and scope, 2) the project location, 3) the beginning date of the project, 4) the dates of fieldwork, 5) a description of the field activities, 6) the level of field activity, 7) the ending date of the project, 8) the land ownership (or agency jurisdiction), and 9) the agencies and companies identified as participants in the project. The level of field activity refers one of five levels assigned after an evaluation of field activities. The five levels are: 1) locations where radioactive materials were used for tracer experiments; 2) locations where conventional explosives were used to test for excavation and cratering experiments or for scaling experiments prior to proposed nuclear detonations; 3) locations where geologic or hydrologic tests were conducted to evaluate a site for tracer or explosives tests; 4) locations where existing facilities, such as mines, wells, and drill holes, were utilized for data collection; and 5) locations where activity was confined to conceptual designs, background research, and visual field inspections. In Chapter 2.2, there is detailed discussion of the project methodology.

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AQUARIUS
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	<p>Aquarius focused on the feasibility of using nuclear explosives to reconfigure the landscape in Arizona in order to use available rain water. The two principal applications under consideration were: 1) to collect water in underground storage that was being lost into depleted aquifers, and 2) the retention of water in surface reservoirs. In 1967, the State of Arizona completed a water management report that identified two prime sites, both approximately 20 miles south of Winslow on Chevelon and Clear Creeks. The Lawrence Radiation Laboratory reviewed the Arizona report and thought that aquifer recharge was not practical due to the permeability of the sandstone in the area and determined surface storage to be the most promising. A joint U.S Atomic Energy Commission and State of Arizona study involving various other state and federal agencies was authorized in 1968. The five study objectives were: 1) to investigate the feasibility of using nuclear explosives in connection with water management in Arizona; 2) to explore locations in Arizona where experimental nuclear explosions for water management might be conducted; 3) to make a cost analysis of nuclear versus conventional techniques for water management projects; 4) to prepare recommendations for future actions, and 5) to prepare and publish a report describing the study and summarizing its findings and conclusions. At least 22 localities within the State of Arizona were considered as potential sites for either surface water management or subsurface recharge craters. Ultimately, two sites were chosen for further investigation, the San Simon and the Clear Creek sites. The San Simon site was selected as the potential location for a cratering experiment in which a nuclear detonation and the resultant surface crater would be used to capture surface runoff to enhance groundwater recharge in an alluvial basin (a water-table aquifer). However, the Clear Creek site became the preferred location for the project. On March 27, 1969, the Arizona Atomic Energy Commission issued an announcement that the State of</p>

Aquarius (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope (cont.)		Arizona Atomic Energy Commission, the U.S. Atomic Energy Commission, and the U.S. Department of Interior would be initiating field investigations in April at the Clear Creek site for safety and cost comparisons of conventional versus nuclear dam construction methods. For reasons not known, by March of 1970, the completion of the feasibility study was pending with no additional work planned on the Aquarius project. The Clear Creek and the Cave Creek (San Simon site) reservoirs were ultimately built by the U.S. Bureau of Reclamation.
2. Location	C	The San Simon site is located in the Cave Creek area (E1/2, Sec. 8, T17S R32E) of the San Simon Basin in southeastern Arizona, southeast of Wilcox near the New Mexico border. The Clear Creek Site was midway between Payson and Winslow in central Arizona and immediately downstream of the confluence of Clear Creek and Willow Creek.
3. Beginning Date	C	Project Aquarius was initiated in 1966.
4. Fieldwork Dates	C	Field visits to the Clear Creek Site were planned and probably occurred in 1968 and possibly 1969. It is not known if field visits were conducted at other locations. Field activity was confined to visual inspections of the areas.
5. Fieldwork Description	C	In 1965, the State of Arizona Land Department produced a report on the hydrologic data for this area, based on drillers' logs from five water wells. Project Aquarius scientists recognized that these data were not enough to clearly define the groundwater environment. No new wells were developed at this Aquarius location.
6. Activity Level	C	Aquarius was a Level 4 activity involving field inspections and obtaining data from existing wells.
7. Ending Date	C	The project ceased in 1970 sometime after March 5, 1970, based on a comment at an authorization hearing and the absence of documentation after early 1970.

Aquarius (continued)

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
8. Land Ownership	C	The San Simon site was on land under the jurisdiction of the Bureau of Land Management. The final Aquarius location, the Clear Creek site, was in the Sitgreaves National Forest.
9. Agencies/Companies	C	Project participants included the Arizona Atomic Energy Commission; Arizona Hydrology and Water Resources Office; University of Arizona; Arizona Interstate Stream Commission; Arizona State Land Department; Bechtel Corporation; CER Geonuclear Corporation; the U.S. Atomic Energy Commission, San Francisco Operations Office and Nevada Operations Office; Lawrence Radiation Laboratory; U.S. Geological Survey, Denver; U.S. Bureau of Reclamation, Phoenix and Boulder City; and the U.S. Public Health Service, Las Vegas.

*C= complete, P= partial data, N= no data

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BOCA BYPASS
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	The Boca Bypass project was a proposal to construct a bypass for the Southern Pacific Railroad line near Boca, California, north of Lake Tahoe, California. An existing 300 ft of railroad track was in need of extensive repair. Utilizing nuclear explosives to excavate a cut with a maximum depth of 440 ft, would reduce the track length to 16,000 ft and provide a new, upgraded track for the railroad.
2. Location	C	The exact location of the Boca Pass realignment of the Southern Pacific Railroad is in the Sierra Nevada Mountain Range just south of Boca, in Nevada County, California. The town of Truckee, California is 3.5 miles to the southwest and Reno, Nevada is 15 miles to the east. The west end of the 3 mile long route began in the NW1/4SW1/4, Sec. 5, T17N R17E (Mt. Diablo Meridian) and headed northeast across the Truckee River and into Union Valley proceeding through the NW1/4NW1/4, Sec. 4, T17N R 17E, the SE1/4, Sec. 33, T18N R17E, and the SW1/4, Sec. 34, T18N R17E. The route re-crossed the Truckee River finally ending in the NW1/4SE1/4, Sec. 34 near the small community of Hirschdale, California. The UTM coordinates for the western terminus are NAD 27, UTM Zone 10, 748,160E, 4,359,405N and the eastern terminus, NAD 27, UTM Zone 10, 752,340E, 4,361,425N.
3. Beginning Date	C	The initial studies to identify potential nuclear excavation project locations on the Southern Pacific Railroad system, including the Boca Pass re-route, began in 1962.
4. Fieldwork Dates	C	The documentation does not indicate that any fieldwork was conducted for the project.
5. Fieldwork Description	C	Fieldwork, at most, consisted of on-site visual inspection of the proposed project area.
6. Activity Level	C	Boca Bypass was a Level 5 activity. Activity for this project was limited to conceptual design, background research based on existing data, and possibly visual examination of the proposed project area.

Boca Bypass (continued)

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
7. Ending Date	C	A report on the preliminary investigation for the project concept was completed on November 13, 1962. The project appears in a 1964 U.S. Atomic Energy Commission document as suggested nuclear excavation project. The exact end date for the project is not known.
8. Land Ownership	P	Part of the proposed project area fell within land administered by the U.S. Forest Service. The land ownership of the other parcels is unknown.
9. Agencies/Companies	C	Project participants included the Bechtel Corporation; Southern Pacific Railroad; U.S. Army Engineer Nuclear Cratering Group; Lawrence Radiation Laboratory; and the U.S. Atomic Energy Commission.

*C= complete, P= partial data, N= no data

BO-PEEP
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	The purpose of Bo-Peep was to stimulate liquid petroleum production by fracturing oil shale with nuclear explosives. Industry approached the U.S. Atomic Energy Commission and Lawrence Radiation Laboratory conducted a very preliminary analysis and determined that there were no radiological and safety concerns. However, the laboratory needed more geological data in order to proceed with a technical feasibility study. Magma Power Company was asked for more data. There is no information to indicate that Magma Power Company bored exploratory holes in response to this request or provided any more data.
2. Location	C	The project area was 36,000 acres of land in Humboldt County, California. Specific project locations within this area were not identified during the project.
3. Beginning Date	C	The project began on March 18, 1966.
4. Fieldwork Dates	C	No fieldwork was initiated.
5. Fieldwork Description	C	Not Applicable
6. Activity Level	C	Project Bo-Peep was a Level 5 activity.
7. Ending Date	C	The project was last mentioned in an October 31, 1966 document.
8. Land Ownership	N	Land ownership is unknown. The industrial proponents said they controlled 36,000 acres of land in southern Humboldt County but it is unclear if this was leased land or private land.
9. Agencies/Companies	C	The U.S. Atomic Energy Commission, Nevada Operations Office; the Lawrence Radiation Laboratory; Magma Power Company; and Lloyd Corporation Ltd.

*C= complete, P= partial data, N= no data

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BRONCO
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Project Bronco was designed to investigate the application of nuclear technology to oil shale stimulation and recovery. The objectives for Project Bronco were to assess the technical and economic feasibility of in situ retorting in a nuclear fractured zone; to refine knowledge regarding nuclear explosions in oil shale; and to study the radioactivity in the rubble chimney after detonation and in the recovered oil during in situ retorting.
2. Location	C	<p>The Piceance Creek Basin in western Colorado was selected for the Project Bronco experiment. Located in Rio Blanco County, the project area was north of Grand Junction and west of Rifle, Colorado. The project's three drill holes were located as follows:</p> <p>USBM/AEC Core Hole No. 1 - situated at the eastern edge of the Yellow Creek drainage channel in the NW1/4NE1/4SE1/4, Sec. 13, T1N R98W.</p> <p>USBM/AEC Core Hole No. 2 - 0.75 miles south of Duck Creek in the SE1/4NW1/4NE1/4, Sec. 14, T1S R99W.</p> <p>USBM/AEC Core Hole No. 3 (aka. Bronco BR-1) – west of the Yellow Creek drainage channel in the SW1/4SW1/4SW1/4, Sec. 15, T1N R98W.</p>
3. Beginning Date	C	The initial concept for Project Bronco originated in either 1962 or 1963 with site selection process beginning in 1964.
4. Fieldwork Dates	C	Site selection began in 1964. The project's three exploratory drill holes were completed between 1965 and 1968. No field work by the U.S.
5. Fieldwork Description	C	Three exploratory holes, USBM/AEC Core Hole Nos. 1, 2, and 3 were drilled to varying depths. Geological, geophysical and hydrological characterizations of the oil

Bronco (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
5. Fieldwork Description (cont.)		shale deposit were made using the cores from these drill holes. Several dirt access roads were graded.
6. Activity Level	C	Project Bronco was a Level 3 activity which corresponds to fieldwork limited to drilling wells, setting up limited support facilities, and grading access roads. The project sites were visited in FY2003 and FY2005.
7. Ending Date	C	The project was considered inactive by May 1970.
8. Land Ownership	C	A review of the land status records on file at the National Nuclear Security Administration Nevada Site Office in Las Vegas confirmed that the legal jurisdiction for the Bronco Experiment Site was returned to the U.S. Bureau of Land Management from the U.S. Department of Energy in 2001.
9. Agencies/Companies	C	Project participants included the U.S. Atomic Energy Commission, San Francisco Operations Office, and Nevada Operations Office; U.S. Bureau of Mines; U.S. Geological Survey; CER Geonuclear Corporation; Lawrence Radiation Laboratory, University of California; U.S. Bureau of Mines, Petroleum Research Center, Laramie, Wyoming; Oak Ridge National Laboratory, Atlantic Richfield Co., Cities Service Oil Co., Continental Oil Co., El Paso Natural Gas Co., Equity Oil Co., Getty Oil Co., Marathon Oil Co., Mobil Oil Co., Shell Oil Co, Sinclair Oil & Gas Co., Sohio Petroleum Co., Sun Oil Co., Tenneco Oil Co., Texaco Inc., The Cleveland-Cliffs Iron Co., The Superior Oil Co., Union Pacific Railroad Co., and Western Oil Shale Corporation.

*C= complete, P= partial data, N= no data

BRUNEAU CANYON DAM
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	The Bruneau Canyon Dam was a proposed project to construct a high rock-fill ejecta dam using a nuclear bulk construction technique in a canyon on the Bruneau River in southwestern Idaho. The proposal called for detonating a 200 kt nuclear explosive in the east wall of the canyon to produce an embankment by bulking the fractured rock to fill the canyon to the desired height for the dam.
2. Location	C	Bruneau Canyon, on the Bruneau River in southwestern Idaho, is 60 miles long, 1300 ft wide, and 800 ft deep. Locations considered for the dam were from river mile 38 at the mouth of the East Fork, to mile 26 where the river leaves the canyon area. The site selected was at river mile 30.3 approximately 60 miles west of Twin Falls, Idaho. Earlier, in 1965, a site above the East Fork was suggested for a dam but not considered in the feasibility study because it was at a location that would leave a large part of the river basin undeveloped.
3. Beginning Date	C	By the end of 1965, the Nuclear Cratering Group was discussing the idea of building a dam using nuclear explosives in Bruneau Canyon. In an April 19, 1966 letter from the Nuclear Cratering Group, the North Pacific Division was requested to study the use of nuclear construction to build a dam at Bruneau Canyon. On April 25, 1966, the Walla Walla Engineer District was assigned to make the study.
4. Fieldwork Dates	C	Laboratory scale tests were conducted in May 1967. Dates for possible field visits to the Bruneau Canyon area are not known.
5. Fieldwork Description	C	Laboratory scale explosives studies were conducted by the U.S. Army Engineer Nuclear Cratering Group at Lawrence Radiation Laboratory's Site 300 facility to test the explosive bulk construction technique. The extent of fieldwork for the feasibility study is not known, but appears to be limited to background research and possible site visits.

Bruneau Canyon Dam (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
6. Activity Level	C	Bruneau Canyon Dam was a Level 5 activity. Work on the project included conceptual design and background research.
7. Ending Date	C	The negative results of the economic analysis for the nuclear excavation feasibility study for the Bruneau Canyon Dam essentially ended the project by mid-1968.
8. Land Ownership	C	The canyon is under federal jurisdiction administered by the U.S. Department of the Interior, Bureau of Land Management, Idaho State Office.
9. Agencies/Companies	C	Project participants included the State of Idaho Water Resources Board; U.S. Army Engineer Nuclear Cratering Group; U.S. Army Corps of Engineers, Walla Walla District; and the U.S. Atomic Energy Commission.

*C= complete, P= partial data, N= no data

CADDO PINE ISLAND
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Caddo Pine Island was a proposed experimental project to use high explosives to stimulate oil recovery from the Caddo Pine Oil Field in northwest Louisiana.
2. Location	C	The Pine Island oil field is located in Caddo Parish, Louisiana, about 20 miles northwest of Shreveport, Louisiana. The field covers approximately 27,000 acres and has 17,000 wells. The first location identified for an experiment was a Petrol Industries lease near Oil City within the company's Muslow B lease in the NW1/4NE1/4, Sec. 18, T20N R15W. The proposed site then moved to a second location in the Muslow B lease in the NE1/4SE1/4, Sec. 17, T20N R15W. Subsequently, this site was replaced with a nearby site on Petrol Industries' 80 acre Palo Lease with the legal designation of the N1/2NE1/4, Sec. 17, T20N R15W.
3. Beginning Date	C	Discussions between the Lawrence Livermore Laboratory, Cities Services Oil Company, and Bohannon Oil concerning an explosive oil stimulation experiment in the Caddo Pine Island oil field began in early 1974 (March- April).
4. Fieldwork Dates	C	Fieldwork originally was scheduled from August to December 1974 with a final report due in March 1975. The fieldwork was rescheduled for late 1974, eventually pushed into 1975, and finally postponed. Apparently, no fieldwork except for site visits was conducted.
5. Fieldwork Description	C	Site visits by participants consisted of visual examination of the area.
6. Activity Level	C	Caddo Pine Island was a Level 5 activity. Field activity for the project was confined to conceptual design, background research, and visual field inspections.
7. Ending Date	C	The last correspondence regarding the project was April 8, 1975. The project was not executed.

Caddo Pine Island (continued)

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
8. Land Ownership	C	At the time of the proposed stimulation experiment, Petrol Industries had the oil and gas lease for the parcel in the N1/2NE1/4, Sec. 17, T20N R15W from Palo (unknown if Palo is a person or company).
9. Agencies/Companies	C	Project participants included the U.S. Atomic Energy Commission and Energy Research and Development Agency, San Francisco Operations Office; Lawrence Livermore Laboratory; Exploration-Production Research Laboratory, Cities Service Oil Company; Energy Oil and Gas Corporation; A.J. Kavanaugh and Associates; Petrol Industries, Inc; Bohannon Oil Company; Incline Village Investment Co.; and Maxfield Radiological Center

*C= complete, P= partial data, N= no data

CAPE DARBY HARBOR
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Nuclear excavation of a harbor at Cape Darby, Norton Sound, Alaska. It does appear that there may be some confusion in the documentation relating to the differentiation between a harbor at Nome (see Nome Harbor) and a harbor near Nome (Cape Darby).
2. Location	C	Cape Darby is 100 miles east of Nome, Alaska on the west edge of Norton Sound, and at the south end of a small peninsula. The section of coast considered for the harbor runs from Cape Darby north to the small fishing village of Elim along the east side of the peninsula on Norton Sound.
3. Beginning Date	C	The first mention of the excavation of a harbor in Alaska with nuclear explosives is 1958.
4. Fieldwork Dates	C	No fieldwork was conducted.
5. Fieldwork Description	C	Data for analysis was obtained from published sources and other records. No fieldwork was conducted.
6. Activity Level	C	Cape Darby was a Level 5 activity. Activity for the project was confined to background research.
7. Ending Date	C	No documents have been located that mention the project after 1958.
8. Land Ownership	C	The proposed harbor site near Cape Darby is under federal jurisdiction. Waters in the area are part of the Alaska Maritime National Wildlife Refuge administered by the U.S. Department of the Interior, U.S. Fish and Wildlife Service.
9. Agencies/Companies	C	E. J. Longyear Company; Lawrence Radiation Laboratory; and the U.S. Atomic Energy Commission.

*C= complete, P= partial data, N= no data

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CARRYALL
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Project Carryall was a joint industry and U.S. Atomic Energy Commission project to use nuclear excavation to build a new highway and railroad corridor through the Bristol Mountains in the Mojave Desert in Southern California between Barstow and Needles. The nuclear excavation was designed to allow the highway and railroad to use different areas of the same excavation channel. The channel would be 11,000 ft long to a maximum depth of 360 ft with a width ranging between 600 and 1,300 ft across the top. In order to achieve the construction design, Plowshare technology would involve detonating devices ranging in yield from 20 to 200 kt with a total yield of 1,730 kt, excavating approximately 68 million cubic yards of material. Also, a nuclear crater was proposed to serve as a detention basin for drainage from the Orange Blossom Wash, a major wash that crossed the proposed excavation channel. A feasibility study was completed but the project was not conducted.
2. Location	C	The study area was in Sec. 10 through Sec. 13, T7N R11E, about 11 miles north of the small town of Amboy, California in the Bristol Mountains in the Mojave Desert.
3. Beginning Date	C	The project began in early 1960s with the first documentation in 1963.
4. Fieldwork Dates	C	Field visits were conducted for the feasibility study between 1963 and 1966.
5. Fieldwork Description	C	Field visits were made to the Bristol Mountains to familiarize personnel with the study area. There is no mention of coring or other activities, although these were part of the project execution plan.
6. Activity Level	C	Project Carryall was a Level 4 activity with field data collection, a conceptual design, and utilization of existing data.

Carryall (continued)

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
7. Ending Date	C	The highway realignment portion of the project ended in 1966 when the California Division of Highways realized that it would have to use conventional methods in order to meet its deadlines. The railroad portion was still under discussion as late as 1970.
8. Land Ownership	C	The project area is under federal ownership and administered by the Bureau of Land Management.
9. Agencies/Companies	C	Project participants included the Atchison, Topeka, and Santa Fe Railway; U.S. Atomic Energy Commission; San Francisco Operations Office and Nevada Operations Office; California State Division of Highways; and Lawrence Radiation Laboratory.

*C= complete, P= partial data, N= no data

CHASE
Vela Uniform Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Operation CHASE (“Cut Holes and Sink ‘Em”) was a program for disposing surplus munitions by loading them on obsolete vessels and sinking them in ocean waters. Beginning in 1965, with CHASE III, the U. S. Department of Defense Advanced Research Projects Agency took advantage of the ocean munitions disposal program to conduct a series of Project CHASE seismic experiments. The goal of the experiments was to monitor underwater blasts to obtain baseline seismic data to investigate the difference between the seismic signatures of dry land-centered seismic occurrences with water-centered detonations. Seismic studies were planned in conjunction with the CHASE III, IV, V and VI disposals. The project included the detonation of surplus ammunition with yields from 300 to 1000 tons of TNT equivalent.
2. Location	C	CHASE III and IV were executed in the Atlantic Ocean off the coast of Virginia at a depth of approximately 900 ft below the water surface. CHASE III was conducted on July 15, 1965 at 37°20'N Latitude 74°35'W Longitude, and CHASE IV was conducted on September 16, 1965 at 37°19'N Latitude 74°44'W Longitude. The test location for CHASE V was off the coast of northern California near the Mendocino Escarpment near Cape Mendicino. The U.S. Office of Naval Research conducted the CHASE V test on May 24, 1966 at 05:49:06 GMT at 39°28'N Latitude 125°48'W Longitude with the ammunition 3,750 ft below the water surface. CHASE VI was planned for a location in the Aleutian volcanic arc, west of Amchitka Island at 51°12'N Latitude 178°26' E Longitude at a depth of approximately 1,000 ft below the water surface. It is not known if the CHASE VI test was ever conducted.
3. Beginning Date	C	By early 1965 CHASE experiments were in the planning stage.
4. Fieldwork Dates	C	CHASE III was conducted in the Atlantic Ocean on July 15, 1965 and followed by CHASE IV on September 16, 1965. May 24, 1966 is the date of the CHASE V test in the Pacific Ocean. The CHASE VI experiment was scheduled for early July 1967.

CHASE (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
5. Fieldwork Description	P	Descriptions of the fieldwork for the CHASE III and CHASE IV tests are not available. To carry out the CHASE V test, the U.S. Office of Naval Research personnel loaded explosives onto the <i>Issac van Zandt</i> , an expendable Liberty ship obtained from the U.S. Maritime Administration Office. The vessel was anchored in 12,500 ft of water and the ammunition detonated at 3,750 ft below the water surface, sinking the ship. Shortly before the test, hydroacoustic equipment was placed in the ocean and subsequently retrieved. Land-based seismic stations and vessels with monitoring equipment recorded the data from the experiment. No documentation is available about fieldwork relevant to CHASE VI.
6. Activity Level	P	CHASE III, IV, and V were Level 2 activities due to the use of conventional munitions. The activity level of CHASE VI is not known.
7. Ending Date	C	CHASE III and IV were conducted in 1965. The CHASE V test was conducted on May 24, 1966 and results were collated over the next month or so. CHASE VI was scheduled for the summer of 1967, but the outcome of this munitions disposal is not known.
8. Land Ownership	C	CHASE III and IV were located in the Atlantic Ocean off the coast of Virginia. The detonation location for CHASE V is 83 miles west of the California coast in the Pacific Ocean. CHASE VI was planned for a location 35 miles west of Amchitka in the Pacific Ocean. The CHASE detonations were conducted in International Waters.

CHASE (continued)

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
9. Agencies/Companies	C	Project participants included the U.S. Atomic Energy Commission; Advanced Research Projects Agency, Nuclear Test Detection Office; U.S. Bureau of Naval Weapons; U.S. Office of Naval Research; U.S. Maritime Administration; U.S. Air Force Technical Applications Center; U.S. Air Force Office of Scientific Research; Geotech Division of Teledyne Industries, Garland, TX; Underwater Systems, Inc.; U. S. Geological Survey; Seismic Station, University of California, Berkeley; Scripps Institution of Oceanography, University of California, San Diego; University of Oregon; University of Hawaii; Stanford Research Institute; California Department of Water Resources; University of British Columbia; University of Nevada, Reno; Columbia University; and Alaska Department of Fish and Game.

*C= complete, P= partial data, N= no data

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CHOMLY CUTOFF
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Chomly Cutoff was a proposed nuclear excavation project to construct a small to medium boat channel through a narrow, steep-sided valley.
2. Location	C	The proposed Chomly Cutoff was located in the southern portion of Prince of Wales Island, approximately 35 miles east of Ketchikan, Alaska. The cutoff extended from the west arm of Cholmondeley Sound near the abandoned town of Chomly to Hetta Inlet which opens onto Cordova Bay and the Pacific Ocean.
3. Beginning Date	C	In May of 1963, at a seminar held at Lawrence Radiation Laboratory between the Laboratory and Army Corps of Engineers personnel from various districts, Plowshare study projects were identified from planned Army Corps of Engineers projects. Chomly Cutoff was one of the identified projects. The concept of using nuclear explosives to build the channel began in 1963: the idea of a channel was considered prior to this time, but was considered “unjustified.”
4. Fieldwork Dates	N	It is not known if any fieldwork was conducted. The draft report for Chomly Cutoff has not been located.
5. Fieldwork Description	N	Extent, if any, is unknown.
6. Activity Level	C	Chomly Cutoff was a Level 5 activity. The primary document for this project has not been located, but there is no documentation to suggest that the project moved beyond the conceptual design phase.
7. Ending Date	P	The project was still under consideration in 1967, but was never conducted. The precise ending date for the project is unknown.
8. Land Ownership	C	The proposed project area is within the boundaries of the Tongass National Forest on land administered by the U.S. Forest Service.

Chomly Cutoff (continued)

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
9. Agencies/Companies	P	Project participants included the U.S. Atomic Energy Commission; U.S. Army Engineer Nuclear Cratering Group; U.S. Army Corps of Engineers, Alaska District; and the Lawrence Radiation Laboratory.

*C= complete, P= partial data, N= no data

COCHITI DAM
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	The proposed nuclear quarrying experiment was planned to provide construction stone for the Cochiti Dam and Reservoir on the Rio Grande River in New Mexico.
2. Location	P	Three potential quarry sites for the project are located in a basalt-capped mesa approximately three miles northeast of the dam site in Sandoval County, New Mexico. The three locations are within a mile of each other in T. 16 N., R. 6E. The approximate locations are 37°38' N, Longitude 106°16' W. The city of Santa Fe is approximately 20 miles east-northeast of the quarry site. Los Alamos is due north and Albuquerque is to the south. Additional documentation is needed to determine precise locations.
3. Beginning Date	C	The project concept was first proposed in late 1965 or early 1966.
4. Fieldwork Dates	P	Some preliminary fieldwork was conducted as part of the Albuquerque Engineer District's 1966 feasibility studies, but the extent and chronology of the work is unknown. The original feasibility report prepared by the U.S. Army Corps of Engineers, Albuquerque Engineer District in December 1966 entitled "Cochiti Dam and Reservoir Project: Rio Grande and Tributaries, New Mexico: Protection Stone, Nuclear Quarry Feasibility Study" has not been located.
5. Fieldwork Description	P	The proposed site selection/characterization studies included drilling a 1000 ft hole to determine the nature of the geological deposits at the quarry sites and the aquifer, and to determine the transmission characteristic of the geological formations in the project area; sediment sampling of stream channels and stock ponds; water sampling of Rio Grande River and existing wells in the region; and drilling a 500 ft deep hydrologic test hole located down slope of the tentative quarry sites. It is not known if any of these field activities took place. Additional documentation is required.

Cochiti Dam (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
6. Activity Level	C	Cochiti Dam was a Level 4 activity. The extent of field work for the feasibility study is not known, however some drilling was conducted for site selection/characterization studies.
7. Ending Date	C	By 1968, the nuclear excavation component of the Cochiti Dam and Reservoir was abandoned. Construction of the dam using conventional methods was underway by this time, and the dam was opened in 1973.
8. Land Ownership	C	This location is on public land. The U.S. Army Corps of Engineers is the land management agency responsible for the dam. The reservoir, Lake Cochiti, is within the boundaries of the Pueblo de Cochiti Reservation.
9. Agencies/Companies	C	Project participants included the U.S. Atomic Energy Commission; U.S. Army Engineer Nuclear Cratering Group, and Albuquerque Engineer District; Lawrence Radiation Laboratory; U.S. Public Health Service; and Southwest Radiological Health Laboratory.

*C= complete, P= partial data, N= no data

COLONA EARTHQUAKE
Vela Uniform Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Project Colona Earthquake, sponsored by the Long Range Seismic Measurements Program, involved the comparative analysis of monitoring data derived from the February 5, 1962 earthquake in southwestern Colorado near the community of Colona and underground nuclear tests. The Colona Earthquake occurred at 14:45:51 GMT with a magnitude of 4.2 on the Richter scale.
2. Location	C	The Colona Earthquake's epicenter was at approximately 38°12' N Latitude 107°36' W Longitude at a depth of 25 km below the surface.
3. Beginning Date	C	The earthquake occurred on February 5, 1962.
4. Fieldwork Dates	C	The data was obtained on February 5, 1962.
5. Fieldwork Description	C	Equipment involved in the Colona Earthquake Project consisted of 36 mobile seismic stations distributed at various locations throughout the continental United States. At the time of the quake, most of the mobile stations were concentrated in the western United States, south and west of the Colorado epicenter, but six were located east of the 95 th meridian.
6. Activity Level	C	The Colona Earthquake was a Level 4 activity with data obtained from existing monitoring stations.
7. Ending Date	C	Data analysis was completed by February 1963.
8. Land Ownership	C	The Colona Earthquake occurred in Uncompahgre National Forest.

Colona Earthquake (continued)

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
9. Agencies/Companies	C	Project participants included Geotechnical Corporation, Dallas, TX; the Advanced Research Projects Agency, Nuclear Test Detection Office; the U.S. Atomic Energy Commission; the United States Air Force, Air Force Technical Applications Center; and United Earth Sciences Division of United ElectroDynamics, Inc., Alexandria, VA.

*C= complete, P= partial data, N= no data

COPPER ORE CHEMICAL MINING
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	<p>The concept for Copper Ore Chemical Mining project was based on the idea that copper could be leached in situ from primary copper sulfide deposits. The project had two major technological components. First, the design required using nuclear explosives to create a rubble chimney beneath the water table. Second, an oxygenation process would be used to leach the rubbilized ore. Oxygenation of the fracture ore body involved allowing the chimney to fill with water, oxygen would then be introduced under pressure at the bottom of the chimney, and as the oxygen moved up through the water and rubble some of the metals would be oxidized to produce heat and sulfuric acid. This solution would leach copper from the ore rubble and then be pumped to the surface for processing. This differed from an earlier Plowshare Program concept for recovery of copper that was based on using nuclear explosives to fracture oxidized, sulfide copper ore, and in some cases the use of in situ leaching to recover the ore. The chemical mining concept was introduced by A. E. Lewis of the Lawrence Radiation Laboratory who developed procedures for in situ leaching of primary deposits in laboratory tests.</p>
2. Location	C	<p>At least 25 properties were listed as possibly having suitable ore deposits for the copper project. The list of possible locations included deposits in the states of Alaska, California, Colorado, Idaho, Nevada, New Mexico, Utah, and Washington. Four mines were under consideration by the Kennecott Copper Corporation in Utah, Nevada, and Arizona. Specific locations for these properties are listed below.</p> <p>1) The Southwest Tintic site is located in Juab County, Utah on the eastern slope of the Tintic Valley between 5,840 and 6,080 ft in elevation. The proposed experiment parcel is kidney-shaped and covers portions of Sec. 13 and Sec. 24, T11S R3W. At its nearest point, it is about 2,000 ft east of U.S. Highway 6.</p>

Copper Ore Chemical Mining (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
2. Location (cont.)	C	<p>2) The Butte Valley site is in Butte Valley, White Pine County, Nevada, about 40 miles north-northeast of the town of Ely. The proposed mine is at about 6,300 ft in elevation near the base of the Cherry Creek Range. It is situated in portions of Sec. 6 and Sec. 7, T22N R61E.</p> <p>3) The Courtland-Gleeson site is in Cochise County, Arizona, 1.5 miles north of the old mining town of Gleeson. It is at an elevation of about 5,000 ft in the SE1/4, Sec. 30, T19S R25E.</p> <p>4) The Safford site is in Graham County, Arizona about 10 miles northeast of Safford, the county seat. The proposed mine is located at the crest of the Gila Mountains between 4,200 and 5,500 ft in portions of Sec. 5, Sec. 6, Sec. 7, and Sec. 8, T6S R27E.</p> <p>Finally, the Anaconda Mining Company proposed mining the Kelly Ore formation at the Berkeley Pit, Butte, Montana.</p>
3. Beginning Date	C	The project concept was introduced in December 1969 in a paper by A. E. Lewis of the Lawrence Livermore Laboratory.
4. Fieldwork Dates	C	Preliminary environmental survey for the final four mines that were selected by the Kennecott Copper Corporation was conducted by Battelle in 1973. Representatives from the U.S. Atomic Energy Commission and Lawrence Livermore Laboratory visited the Berkeley Pit in Butte, Montana, in July 1974.
5. Fieldwork Description	C	General field reconnaissance of the final four sites under consideration by the Kennecott Copper Corporation was conducted in 1973 with no field characterization activities.
6. Activity Level	C	Copper Ore Chemical Mining was a Level 5 activity. Activity was confined to laboratory studies, conceptual design, background research, and visual field inspections.

Copper Ore Chemical Mining (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
7. Ending Date	C	Studies on the in situ chemical mining technique for primary copper ore deposits using nuclear explosive mining techniques continued until the end of 1974. There is no documentation to suggest that studies continued into 1975. The project was not executed.
8. Land Ownership	C	<p>Land ownership of the final four sites examined by Kennecott Copper Corporation is detailed in the 1973 Battelle report.</p> <p>1) Most of the Tintic Valley, Utah site is on land administered by the Bureau of Land Management, Utah State Office. However, about one-fourth of Section 13 is under private ownership. A grazing permit for the federal land in the area is jointly held by the Okleberry Cattle Co., Ned Okleberry, and E. Ray Okleberry.</p> <p>2) The Butte Valley, Nevada site is administered by the U.S. Department of the Interior, Bureau of Land Management, Nevada State Office. At the time of the proposed experiment, a grazing permit for the area was held by the Bertram Paris and Sons Ranch.</p> <p>3) The Courtland-Gleeson site is located on privately owned land, although there are a few parcels of State owned grazing lands in the surrounding area. A recent review of the Arizona Surface Management Responsibility maps confirmed the privately owned status.</p> <p>4) The Safford site was under the jurisdiction of the U.S. Department of the Interior, Bureau of Land Management, Arizona State Office at the time of the proposed experiment. Several grazing allotments were active during that period and these were managed by the BLM Safford Grazing District. However, a recent review of Arizona Surface Management Responsibility maps (see above) indicates that the proposed experiment area is now privately owned.</p>

Copper Ore Chemical Mining (continued)

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
9. Agencies/Companies	C	Project participants included the U.S. Atomic Energy Commission, Washington, D.C. and Nevada Operations Office; Lawrence Radiation/Livermore Laboratory; Ledgemont Laboratory, Kennecott Copper Corporation; Battelle; University of Utah; University of Nevada-Reno, Mackey School of Mines; and the Anaconda Mining Company.

*C= complete, P= partial data, N= no data

COPPER RECOVERY
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	<p>The recovery of copper was the primary focus of the Hansom Project, a project with the general goal to demonstrate the use of nuclear explosions in rock breaking applications. Copper Recovery was based on the idea that the use of nuclear explosives to fracture low-grade copper deposits along with recovery of copper minerals using a technique of in situ leaching would make it possible to acquire more copper ore than through conventional means, and would provide an important demonstration for the Plowshare Program. For the nuclear mining technique, nuclear explosives would be used to fracture a near surface ore body forming a retarc, or create a chimney of fractured ore rubble. Once the ore body was fractured, in situ leaching operations would be used to recover the copper. The successful demonstration of this application relied on finding a copper ore deposit that met a number of requirements. These included: appropriate size and thickness of the ore body; a form of copper ore that could be leached; appropriate subsurface geology for operation of the collection scheme; and isolation of ground water supplies. The Hansom Committee identified about 100 low-grade copper ore deposits in the United States that might be amenable to nuclear mining techniques, and one property, the Safford deposit, received serious study with Project Sloop. The remaining properties are considered here under Copper Recovery.</p>
2. Location	C	<p>Early in the project a number of copper ore deposits were given attention for a Plowshare demonstration. These included:</p> <ol style="list-style-type: none"> 1) Copper Flat, 20 miles southwest of Truth or Consequences, Sierra County, New Mexico, Sec. 26, T15S R7W; 2) Cactus Ore, near Miami, Gila County, Arizona; 3) Butte Reservoir, approximately 15 miles west of Florence, Pinal County, Arizona; and

Copper Recovery (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
2. Location (cont.)		<p>4) the Safford deposit in Graham County, Arizona.</p> <p>In 1965, five locations were reported as alternates for a Copper Recovery project. These included: 1) O.K. Mine, 10 miles northwest of Milford, Beaver County, Utah; 2) Copper Standard Mine, Pinal County, Arizona; 3) Butte Reservoir (see above); 4) Copper Prospect, Gila County, Arizona; and 5) the Copper Creek District, Pinal County, Arizona.</p> <p>As efforts continued to find a suitable deposit for nuclear mining and in situ leaching of copper, nearly 100 copper deposits were considered for a Copper Recovery project. Most were in the western United States, with the majority in the state of Arizona, but also included deposits in: Alaska, California, Colorado, Idaho, Nevada, New Mexico, Texas, Utah, Washington, and Wyoming. A deposit in Virginia and another in New Hampshire were also proposed, as was a location in the Dominican Republic and the Republic of Panama.</p>
3. Beginning Date	C	The project concept was initiated in 1961 with the issue of a report from the Lawrence Radiation Laboratory that introduced the concept.
4. Fieldwork Dates	C	Field visits were made by scientists from the Lawrence Radiation Laboratory to a number of the proposed copper recovery locations in the southwest during the 1960s.
5. Fieldwork Description	C	Mining companies conducted drilling operations, geologic mapping, mineral assessments and other activities associated with mining copper at many of the proposed locations. However, field work, apart from field visits, was not undertaken specifically for a Plowshare mining experiment.
6. Activity Level	C	Copper Recovery was a Level 4 activity and the level of liability is low. Locations with existing facilities, mines and drill holes, were used for data collection at a small number of the proposed locations.
7. Ending Date	C	By the end of the 1960s, questions were being raised concerning the economic feasibility of using nuclear methods to mine low-grade oxide copper deposits. In early 1970 attention

Copper Recovery (continued)

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
7. Ending Date (cont.)		shifted to the recovery of low-grade copper ore from deeply-buried primary copper deposits.
8. Land Ownership	N	There was no field activity, and no determination of ownership was made.
9. Agencies/Companies	C	Participants for this project included: the U.S. Atomic Energy Commission, San Francisco Operations Office; Lawrence Radiation Laboratory (Hansom Committee); U.S. Bureau of Mines; Anaconda Company; Bear Creek Mining Company, Mr. Lotspeich (owner of Copper Flats); Frederic H. Hatch Company; Phelps Dodge Electronic; Kaiser Aluminum and Chemical Corporation; and Rancher Exploration and Development Corporation.

*C= complete, P= partial data, N= no data

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COWBOY
Vela Uniform Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	The purpose of the Cowboy project was to conduct a series of controlled chemical explosions in a salt dome to test proposed theories of decoupling of seismic energy as part of the U.S. Atomic Energy Commission's seismic detection studies. The U.S. Geological Survey identified six possible locations for the project. The Carey Salt Company Mine was chosen based on the features of the salt dome, location, and logistical considerations. Between December 17, 1959 and March 4, 1960, a series of 17 high explosive detonations in tamped, completely contained holes (coupled) and in spherical open cavities (decoupled) were conducted for Project Cowboy. The Cowboy detonations occurred approximately 800 ft below the surface in a section of the Carey mine that was not under production at the time. All of the Cowboy explosions used charges of Pelletol, a TNT explosive in the form of free-flowing oval pellets. As part of Project Cowboy, the U.S. Bureau of Mines investigations included the detonation of several small high-explosive tests in a separate drift of the Carey Salt Mine. These tests were in linear arrays to determine propagation laws for strain in salt and crater tests to determine dynamic breaking strength of salt. The linear array tests totaled 24 and ranged from 2 to 40 lbs of four different types of high explosives. The 15 crater tests all used 8 lbs of one type of high explosive. Project Plowboy, a Plowshare project, was conducted at this same location within a few months.
2. Location	C	Cowboy was conducted in a salt dome mine near Winnfield, Louisiana, 110 miles southeast of Shreveport. The mine was near the southwest corner of Sec. 19, T11N R3W.
3. Beginning Date	C	The project probably was proposed in 1958 as the U.S. Geological Survey submitted a report on potential site locations in March of 1959.

Cowboy (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
4. Fieldwork Dates	C	Construction activities began in August 1959 and the high explosives experiments were completed in March 1960.
5. Fieldwork Description	C	To the existing surface facilities at the mine, the project added several temporary trailers for office space, data analysis and a on-site dining facility. Instrumentation stations were placed at predetermined distances from the mine, up to a range of 50 km. Inside the salt dome, existing mine drifts not being used were altered to accommodate the experiments. For example, the drifts were fitted with equipment and holes were drilled for the tamped experiments. The Pelletol was placed at the test locations and the tests were conducted successfully. There was an agreement with the Carey Salt Mine to maintain facilities and the drifts for two to three years. The project personnel built a storage shed to house some equipment that was mothballed and left on site.
6. Activity Level	C	The Cowboy Project is an activity Level 2 due to the use of conventional explosives.
7. Ending Date	C	The tests were completed on March 4, 1960 with most data analysis and reporting completed the same year.
8. Land Ownership	C	The Carey Salt Company had a lease for mining operations from the Bureau of Land Management.
9. Agencies/Companies	C	Project participants included the U.S. Atomic Energy Commission, Albuquerque Operations Office; U.S. Corps of Engineers; Waterways Experiment Station; Bureau of Mines, Advanced Research Projects Agency; Lawrence Radiation Laboratory; Sandia Corporation; Edgerton, Germeshausen, and Grier, Inc.; Holmes and Narver, Inc.; Carey Salt Company; University of Michigan; Lamont Geological Observatory; U.S. Coast and Geodetic Survey; Stanford Research Institute; and a scientific group from the United Kingdom.

*C= complete, P= partial data, N= no data

DOGSLED
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Project Dogsled was designed to be a media effects nuclear experiment to gather data on scaling and entrapment of radioactivity in either sandstone or limestone. A Pre-Dogsled high explosives program was proposed to determine design requirements for Dogsled. The technical objectives for Dogsled were: 1) to develop theoretical and empirical models for cratering in a dry, porous rock with intermediate-yield range explosives; 2) to gather data on the nature and amounts of radioactivity released; and 3) to study other safety programs as part of the nuclear excavation program. Answering these questions for a dry, porous rock medium was considered critical to developing appropriate designs for full-scale nuclear excavation projects, particularly in regard to the Isthmanian Canal Project with a potential site location in the Gatun sandstone formation. A literature review identified three sandstone formations (the Navajo, the Wingate, and the Cedar Mesa formations of the western Colorado Plateau) as appropriate project locations with the Navajo determined best suited for Project Dogsled. By the end of 1963, the U.S. Geological Survey identified 11 potential sites that met the project criteria, five in northern Arizona and six in southern Utah. These determinations were based on existing data, particularly information obtained during the Glen Canyon dam site planning and construction. Project Dogsled site visits were underway in September 1964, with no documents found dating after this time.
2. Location	C	The proposed locations in northern Arizona were Echo Cliffs (north), Echo Cliffs (south), Kaibito Plateau, the Paris Plateau, and Tsai Skizzi Rock. In southern Utah, the locations were Cedar Mesa, Clark Bench, Early Weed Bench, Red Rock Plateau, Scorpion Flat, and Straight Cliffs (Fortymile Ridge).
3. Beginning Date	C	Dogsled plans were in development as early as 1960 because there was a field trip for Dogsled in January 1961.

Dogsled (continued)

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
4. Fieldwork Dates	P	No exact fieldwork dates were found for the U.S. Geological Survey site selection visits to the areas. It is known that the visits were later than May 1964 and on-going in September 1964.
5. Fieldwork Description	P	There was a field trip for selection of the 11 possible project sites. Field visits to these sites were underway in 1964 but there is no description of the activities.
6. Activity Level	C	Project Dogsled was a Level 4 activity. Activity included conceptual design, background research and site visits.
7. Ending Date	C	Project Dogsled only appears through 1964 on planning documents.
8. Land Ownership	C	The preliminary Dogsled locations in Arizona and Utah are on the Navajo Reservation of the Bureau of Land Management lands.
9. Agencies/Companies	C	Project participants included the Lawrence Radiation Laboratory; U.S. Atomic Energy Commission, Nevada Operations Office; U.S. Geological Survey; and the U.S. Army Engineer, Nuclear Cratering Group.

*C= complete, P= partial data, N= no data

DRAGON TRAIL
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	<p>Project Dragon Trail was a joint Plowshare project between the U.S. Atomic Energy Commission, Continental Oil Company and CER Geonuclear Corporation. The experiment's purpose was to demonstrate the feasibility of using nuclear explosives for gas stimulation. Project Dragon Trail involved the proposed detonation of a 20 kt device 2,700 ft underground in the Mancos Oil Shale Formation in Colorado.</p>
2. Location	C	<p>The Dragon Trail Unit in the Douglas Creek gas field in Rio Blanco County in northwestern Colorado was selected as the experiment site. The proposed location was approximately 50 miles north of Grand Junction and 20 miles south of Rangeley, Colorado in the western portion of the Piceance Creek Basin. Six wells were drilled and their locations follow:</p> <p>Southeast Douglas Creek No. 1 - 466 ft from the north line, 210 ft from the west line, NW1/4NW1/4, Sec. 2, T3S R101W</p> <p>East Dragon Trail No. 2 (aka. Original DT-A) - 660 ft from the south line, 425 ft from the west line, SW1/4SW1/4, Sec. 20, T2S R101W</p> <p>Dragon Trail Unit No. 25-11 (aka DTU #1011) - UTM coordinates Zone 12, 688549m E, 4412218m N, SW1/4SW1/4, Sec. 25, T2S R102W</p> <p>DT-B (aka East Dragon Trail Well No. 5) - 1,877 ft from the north line, 1,382 ft from the west line, Sec. 20, T2S R101</p> <p>WDT-EX (aka DT 24-3, DTU #1303) - 2,322 ft from the south line, 1,875 ft from the east line, Sec. 24, T2S R103W</p> <p>DT-A(2) (aka West Douglas Creek Mancos B) - UTM coordinates Zone 12, 679532m E, 4414015m N, Sec. 24, T2S R103W.</p>

Dragon Trail (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
3. Beginning Date	C	The initial concept for Project Dragon Trail originated in 1966 with a proposal from the Continental Oil Company to the U.S. Atomic Energy Commission.
4. Fieldwork Dates	C	Fieldwork began in 1966 and continued sporadically through early 1969.
5. Fieldwork Description	C	Fieldwork included the drilling of six new wells which were used for the pre-shot geological, geophysical and hydrological characterizations. The immediate area surrounding each of the well locations was bladed and leveled for the drill rig and small equipment sheds. Most locations were on existing gas leases and adjacent to existing graded dirt roads. However, the DT-B location required the construction of a graded access road, a large bladed area for the drill pad, and concrete pads/footings for a recording trailer, drill pipe storage areas, and several equipment sheds.
6. Activity Level	C	Project Dragon Trail was a Level 3 activity which corresponds to fieldwork limited to drilling wells, setting up support facilities, and grading access roads.
7. Ending Date	C	Project Dragon Trail was abandoned in mid-1970 in favor of Project Rio Blanco.
8. Land Ownership	C	The Bureau of Land Management, U.S. Department of the Interior has legal jurisdiction for the various Project Dragon Trail drill hole locations. Currently, most of the locations are on active oil and gas leases.
9. Agencies/Companies	C	Project participants included the U.S. Atomic Energy Commission; U.S. Bureau of Mines, University of California, Lawrence Radiation Laboratory, Livermore; Continental Oil Company; and CER Geonuclear Corporation.

*C= complete, P= partial data, N= no data

DRUM INLET
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Drum Inlet was a high-explosive experiment to excavate the final section of a navigable channel in a saturated sand medium along the Core Banks off the North Carolina coast. The project was designed to demonstrate the use of large conventional explosive charges for a civil engineering excavation that would be economically competitive with conventional excavation techniques. Excavation of the inlet included two phases. First, a conventional dredge was used to excavate a navigation channel within the sound waters and part way through the Core Banks. This phase of the project was administered by the U.S. Army Corps of Engineers, Wilmington District. The final section of construction connected the dredged channel to the Atlantic Ocean by using large charges to excavate a section 385 ft in length and was accomplished with the assistance of the U.S. Army Engineer Waterways Experiment Station Explosive Excavation Research Laboratory (formally the Nuclear Cratering Group). Technical programs to study the Drum Inlet project included: verification of the correct detonations for a saturated medium with and without seawater overlay; the use of photography to investigate crater formation mechanisms; measurement of sand-surface and water-surface peak velocities; observations of dimensions of the dust cloud; measurement of ejecta velocities and ranges; and evaluation of the initial crater dimensions.
2. Location	C	The Drum Inlet navigation channel runs through the Core Banks and connects the Core Sound with Raleigh Bay off the North Carolina coast. Drum Inlet is in the vicinity of Carteret County, North Carolina, three miles southeast of the town of Atlantic. The explosive excavation completed a navigation channel approximately 2 miles south of an inlet that was closed off during storms in February 1971, also named Drum Inlet.

Drum Inlet (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
3. Beginning Date	C	During February 1971, seasonal storms caused the Drum Inlet channel to be closed off. Shortly after, plans were made to excavate a new navigation channel using conventional techniques and explosive excavation. By the end of September 1971, modeling tests were completed at the Site 300 high explosive test facility in Tracy, California. Data from the modeling tests were used to develop the preliminary design plans for dredging and excavating Drum Inlet.
4. Fieldwork Dates	C	The Drum Inlet Project was conducted in two phases under two different contracts administered by the U.S. Army Corps of Engineers, Wilmington District. The first phase began during October 1971 and was completed on November 20, 1971. The explosive event for the second phase was executed on December 23, 1971. The precise dates of fieldwork following the explosive event are not available.
5. Fieldwork Description	C	Fieldwork for Drum Inlet included a dredging operation followed by explosive excavation. The Explosive Excavation Research Laboratory provided design and technical assistance for the explosive excavation phase. Field activities included construction of a project office, explosive storage, assembly and handling facilities, surface markers, camera bunker, firing bunker, and all operational support. For the explosive excavation an ammonium nitrate slurry blasting agent was used and the explosives were primed with Du Pont HDP#1 non-nitroglycerine boosters. Explosive charges were in containers 8.5 ft in length and 2 ft in diameter so that charges could be placed in the sand with a crane and high-pressure water jetting rig. The explosives were emplaced in two 11-charge rows with between-row spacing varying from 36 to 44 ft and within-row spacing ranging from 30 to 39 ft. The two 11-charge rows and four disposal charges in the dredged channel were detonated simultaneously.
6. Activity Level	C	Level 2 activity where high explosives were used to complete the Drum Inlet channel.
7. Ending Date	C	The explosive excavation was executed on December 23, 1971, and the final report was issued during August 1973.

Drum Inlet (continued)

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
8. Land Ownership	C	Drum Inlet is on the Middle Core Banks within the Cape Lookout National Seashore administered by the National Park Service.
9. Agencies/Companies	C	Project participants identified in the documents included the U.S. Army Corps of Engineers, Wilmington District; U.S. Army Engineer Waterways Experiment Station Explosive Excavation Research Laboratory; U.S. Army Engineer Waterways Experiment Station Hydraulics Laboratory; Coastal Engineering Research Center; National Park Service; North Carolina State Department of Fisheries; and the JERAC Corporation, San Diego, CA.

*C= complete, P= partial data, N= no data

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EXCAVATOR
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	<p>Project Excavator was a series of 3-4 high explosive calibration shots proposed to support the nuclear quarrying experiment Project Travois. The experiment's primary goal centered on the investigation of two different explosive construction techniques. The first concept involved the use of explosive charges to produce aggregate suitable for construction of a rock-fill dam while the second approach employed a direct blasting technique to produce an ejecta dam. Project Excavator's second purpose was to supply data for a more accurate determination of the nuclear design parameters required for the Project Travois detonation. The final goal was to verify the suitability of the Twin Springs location.</p>
2. Location	C	<p>Three locations were eventually considered for Project Excavator. These included the Buchanan Dam in California, the Twin Springs Dam in Idaho, and the Catherine Creek Dam in Oregon.</p> <p>The Buchanan Damsite was located on the Chowchilla River, Merced County, CA approximately 17 miles northeast of Chowchilla, 26 miles east of Merced, and 35 miles northwest of Fresno. A potential nuclear quarry site was 2.25 miles due north of the damsite in Mariposa County. The damsite was in the W1/2SE1/4, Sec. 22, T8S R18E. The nuclear quarry ground zero was in the N1/2SE1/4, Sec. 10, T8S R18E. The proposed Angledozer (renamed Excavator) calibration test locations were located east of the quarry site in S1/2, Sec. 11, T8S R18E.</p> <p>The Twin Springs site was on the Boise River, 28 miles east of Boise and about 14 miles upstream from Arrowrock Dam in the Sawtooth Mountains area of the Boise National Forest. The damsite was in SW1/4, Sec. 12, T4N R7E, Boise Principal Meridian, approximately 2 miles below the junction of the North and Middle Forks of the Boise River in Idaho. The dam spanned the boundary between Boise and Elmore counties. The</p>

Excavator (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
2. Location (cont.)		quarry location was about 1 mile to the northwest of the damsite in SW1/2NE1/4, Sec. 12, T4N R6E, Boise County. The exact locations of the high explosive calibration tests are unknown, but they were planned for the north side of the Boise River somewhere between the Twin Springs damsite and several miles downstream.
		The Catherine Creek Damsite was located on a tributary of the Grande Ronde River in northeastern Oregon. The proposed nuclear quarry was 25 miles northeast of Baker City and 8 miles southeast (upstream) of the town of Union near the Oregon, Idaho, and Washington border. The locations for the high explosive calibration shots were never specified.
3. Beginning Date	C	The initial concept for Project Excavator originated in 1966 with the site selection process paralleling the Travois nuclear quarrying experiment.
4. Fieldwork Dates	C	Site selection began in 1966, with field assessments conducted at the different locations between mid -1966 and mid-1969. The nuclear quarry experiment stalled out in 1969 before any of the Project Excavator high explosive calibration shots were conducted.
5. Fieldwork Description	C	At least one geological test hole was drilled at the Twin Springs, Idaho location. Geological, geophysical and hydrological characterizations of the geological formations at all three locations – Buchanan, Twin Springs, and Catherine Creek were made using the cores, measurements, and data from pre-existing drill holes and wells. Several dirt access roads were graded. No evidence was found that more than one of the high explosive calibration holes, Alpha event borehole QH-5, was constructed.
6. Activity Level	C	Project Excavator was a Level 3 activity which corresponds to fieldwork limited to using existing characterization holes, drilling at least one core hole (QH-5) for the Alpha shot, and grading several access roads. The Twin Springs, Idaho project site was visited in FY2004.

Excavator (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
7. Ending Date	C	No activity for the project could be documented after 1969 although some presentations on the associated nuclear quarry, Project Travois, were given in early 1970.
8. Land Ownership	C	During FY 2004, a review of the land status records on file at the Idaho State Office of the Bureau of Land Management in Boise revealed that the Project Excavator project area fell within lands administered by the U.S. Department of Agriculture, Forest Service as part of the Boise National Forest. That agency continues to administer the land today.
9. Agencies/Companies	C	Project participants included the U.S. Atomic Energy Commission, San Francisco Operations Office, and Nevada Operations Office; U.S. Army Engineer Nuclear Cratering Group; Lawrence Radiation Laboratory; U.S. Army Corps of Engineers, Sacramento District and Walla Walla District; Idaho Water Resources Board; U.S. Geological Survey; U.S. Bureau of Reclamation; U.S. Department of Agriculture, Forest Service; Edgerton, Germeshausen, and Grier Inc.; Environmental Science Service Administration; and Sandia Corporation.

*C= complete, P= partial data, N= no data

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GALLEY
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Lawrence Radiation Laboratory proposed projects Buggy and Galley because a row charge of nuclear explosives had never been detonated simultaneously and data were needed to understand the variables in such an event. Project Buggy, in an alluvial media, would study the dimensions of elongated craters in terms of how such dimensions related to yield, depth and spacing of charges. Project Galley, in hard rock, would look at the effect of uneven terrain on crater size, slope stability, and the effect of cratering in different media. The plan was to use data from Buggy for the design of Galley. Conceptually, Galley would be a row charge experiment with geometrical complexities in varying terrain or geology. Galley was also designed to acquire basic data on radioactivity distribution, ground shock, and air blast.
2. Location	C	Project Galley was proposed for southern Idaho but no specific location was ever identified.
3. Beginning Date	C	The project was in the planning stages in 1963.
4. Fieldwork Dates	C	No fieldwork was conducted for Project Galley.
5. Fieldwork Description	C	No fieldwork was conducted for Project Galley.
6. Activity Level	C	Project Galley was a Level 5 activity because there were no field activities.
7. Ending Date	C	The last correspondence regarding Galley was in 1970.
8. Land Ownership	C	This is not applicable because no specific project location was identified in Southern Idaho.

Galley (continued)

9. Agencies/Companies	C	Project participants included the U.S. Atomic Energy Commission; San Francisco Office and Nevada Operations Office; and Lawrence Radiation Laboratory.
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*C= complete, P= partial data, N= no data

GEOTHERMAL POWER PLANT
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	The purpose of the geothermal power plant project was to develop and enhance geothermal conditions with nuclear detonations in order to produce long-term electrical power through an on-site power plant. Concepts were put forward regarding the stimulation of naturally occurring geothermal steam sites and the use of deep, hot rock with water augmentation. For the power plant, research pursued creating a closed system that would be an environmentally safe operation. Several energy companies expressed interest in projects with Plowshare personnel over the years but only one progressed beyond discussions. Under a joint agreement between the U.S. Atomic Energy Commission and American Oil Shale Corporation, a feasibility study was completed that concluded that nuclear augmented geothermal power plants were technically and economically feasible.
2. Location	C	In the 1971 feasibility report, over one million acres of land were identified as valuable for geothermal development in California, Idaho, Montana, Nevada, and New Mexico. Almost 300,000 acres of land deemed potentially valuable were identified in Alaska, California, Idaho, Nevada, Oregon, Utah, and Washington.
3. Beginning Date	C	The idea to stimulate geothermal resources was proposed in 1957 followed by research on project designs and methodology by Lawrence Radiation Laboratory and Battelle Memorial Institute's Pacific Northwest Laboratory. The U.S. Atomic Energy Commission signed an agreement with American Oil Shale Corporation for a feasibility study in 1970.
4. Fieldwork Dates	C	There was no fieldwork conducted for the feasibility study.
5. Fieldwork Description	C	No fieldwork was conducted.
6. Activity Level	C	The Geothermal Power Plant Project activity category was a Level 5 with work based on existing data.

Geothermal Power Plant (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
7. Ending Date	C	The feasibility study was completed in 1971 and all nuclear explosive research had ceased by 1975.
8. Land Ownership	C	The feasibility study discusses federal land valuable for geothermal resources in California, Idaho, Montana, Nevada, and New Mexico. Almost 300,000 acres of federal land deemed potentially valuable were identified in Alaska, California, Idaho, Nevada, Oregon, Utah, and Washington. States listed that had non-federal land with geothermal potential were Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming. No specific locations were identified.
9. Agencies/Companies	C	Geothermal Power Plant participants included the U.S. Atomic Energy Commission, Nevada Operations Office; American Oil Shale Corporation; Sun Oil Company; Phillips Petroleum Company; Battelle Memorial Institute's Pacific Northwest Laboratory; Westinghouse Electric Corporation; Lawrence Radiation Laboratory; Lawrence Berkeley Laboratory; U.S. Geological Survey, Menlo Park, California; Energy Research and Development Administration U.S. Department of Energy; Oregon State Department of Minerals and Resources. This list includes participants for non-Plowshare geothermal power plant activities.

*C= complete, P= partial data, N= no data

GOLD LEACHING
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Gold Leaching was a project concept analogous to the in situ recovery of copper ore. Nuclear explosives would be used to fracture a low-grade gold-bearing ore deposit. Leaching fluids in contact with the gold ore minerals would dissolve the gold and the solution would move downward into a collection zone. The leach solution would be pumped to the surface for extraction of the gold.
2. Location	C	Two gold-bearing ore deposits were identified as possibly suitable for a gold leach Plowshare experiment. These were in the vicinity of Juneau, Alaska, and in northwestern Wyoming east of the Teton Mountain Range. No precise location was ever proposed for a gold leach experiment.
3. Beginning Date	C	Studies concerning the in situ leaching of gold began in 1966 with background studies and laboratory research on the chemistry of the leach process. In early 1968 the U.S. Atomic Energy Commission directed Lawrence Radiation Laboratory to coordinate work on gold leaching with the Bureau of Land Management.
4. Fieldwork Dates	C	No fieldwork was conducted.
5. Fieldwork Description	C	Not Applicable
6. Activity Level	C	Gold Leaching was a Level 5 activity. Activity for the project was limited to conceptual design, background studies, and laboratory research.
7. Ending Date	C	No documents have been located that mention the project concept after 1968.
8. Land Ownership	C	Not Applicable

Gold Leaching (continued)

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
9. Agencies/Companies	C	Project participants included the U.S. Atomic Energy Commission; Lawrence Radiation Laboratory; U.S. Department of the Interior, Bureau of Land Management, U.S. Geological Survey, Oak Ridge National Laboratory; and the Dow Chemical Company.

*C= complete, P= partial data, N= no data

GONDOLA
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Gondola was a nuclear cratering experiment in wet clay shale that was conceptualized in 1963. It was planned as a series of several nuclear experiments designed to study cratering in weak rock types with high water content. The first in the series was Gondola I, a 20 to 200 kt nuclear cratering experiment in a wet, weak clay shale formation that could be either one detonation or a row charge of five 40 kt explosives. Subsequent Gondola experiments under discussion included cratering tests with a wide range of emplacement depths and possibly row charge detonations. The information from these experiments could be applied to the Interoceanic Canal and other programs that involved massive excavations, such as waterway, harbor and reservoir construction. Planning for fieldwork was initiated in 1968 with a number of sites under consideration. This was narrowed down to four locations in South Dakota, Montana, and Nevada. In February 1969, just as the preliminary drilling program was getting underway at the four sites, the project was put on hold due to funding constraints with the expectation that it would resume in early FY 1970 with field data available by late August 1969. However, the project did not resume and a February 20, 1970 memo to project participants terminated the associated committees and indefinitely deferred the project, effectively ending the Gondola project.
2. Location	C	Locations in South Dakota, Montana, and Nevada were under consideration for this nuclear excavation experiment. In South Dakota, the topography and underlying geological formations directly north of the community of Newell and adjacent to Hoover in Butte County were of particular interest to researchers. The locations in Montana were in Carter County. The first was between Albion and Capitol just west of the Little Missouri River. The other Montana location straddled Box Elder Creek near Ridgway, halfway between the towns of Ekalaka and Alzada. The proposed Nevada site was in the Black Rock Desert, west of Winnemucca on the Humboldt-Pershing county lines.

Gondola (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
3. Beginning Date	C	The Gondola project was probably was conceptualized at the time of the planning for Pre-Gondola in the early to mid 1960s. Direct work on the project began in 1968.
4. Fieldwork Dates	C	No fieldwork was conducted for this project.
5. Fieldwork Description	C	A press release from the Office of Public Affairs, U.S. Atomic Energy Commission, Nevada Operations Office, dated January 30, 1969, stated that exploratory drilling to determine the geological characteristics of the sites in all four locations was scheduled to begin within the next few days. Although drilling permits were obtained, the fieldwork was canceled.
6. Activity Level	C	Gondola was a Level 5 activity with site selection data based on existing information.
7. Ending Date	C	Gondola was deferred indefinitely on February 20, 1970.
8. Land Ownership	C	The general areas of all four locations lands were administered by the Bureau of Land Management and state lands.
9. Agencies/Companies	C	Project participants identified in documents were the U.S. Atomic Energy Commission, Division of Peaceful Nuclear Explosives and the Nevada Operations Office; the U.S. Army Nuclear Cratering Group; the U.S. Geological Survey; the Southwest Radiological Health Laboratory, United States Public Health Service; and the Lawrence Radiation Laboratory.

*C= complete, P= partial data, N= no data

GROUNDHOG
Vela Uniform Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Groundhog was a program of 14 high explosive shots for seismic detection and recognition of underground explosions. The primary purpose was to obtain seismic data with the exact position, energy release, and time of initiation known.
2. Location	C	Proposed locations: Group A - Hattiesburg, Mississippi (Dribble location); Group B - Northern Michigan (unspecified existing mine); Group C – C1 through C3 near Hollister or south of San Francisco Bay, California, C4 through C6 near Fallon, Nevada or West Yellowstone, Montana; Group D - D1 Coyote Test Field, Albuquerque, D2 and D3 Nevada Test Site Area 12 (tunnel complex – tuff), D4 and D5 Nevada Test Site Area 15 (granite), D6 and D7 Winnfield, Louisiana (Cowboy location), and D8 through D11 no location suggested.
3. Beginning Date	C	The Groundhog Program Formulation Meeting was held at Headquarters, Defense Atomic Support Agency, on December 22, 1960.
4. Fieldwork Dates	P	The proposed field schedule was July 1961 through April 1963, but the project was not executed.
5. Fieldwork Description	C	Proposed fieldwork was extensive, but most was never implemented. Plans included site visits and final site selection followed by drilling and excavation for emplacement of the high explosive charges. The charges would range in size from 1/2 to 100 tons. Excavation, in some cases, would involve blasting and mucking. On-site facilities would include a control point, photographic stations, and seismic detection instrumentation at ranges to two kilometers placed in bore holes. For a few shots, off-site activities would focus on obtaining seismic measurements at stations located more than two and up to hundreds of miles away from the detonation. Post-shot exploration, drilling, and mining, were planned for Shot Groups A and D.
6. Activity Level	C	Groundhog was a Level 5 activity. Project activity was limited to conceptual design.

Groundhog (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
7. Ending Date	C	Groundhog high explosive tests were not conducted. It appears that the program was suspended when nuclear testing resumed in 1961.
8. Land Ownership	P	The Atomic Energy Commission had jurisdiction for the Nevada Test Site and the Dribble area. The Sandia Corporation operated the Coyote Test Field. Ownership of other proposed locations is not known.
9. Agencies/Companies	C	Participants identified in the documents included the U.S. Atomic Energy Commission, Nevada and Albuquerque Operations Offices; U.S. Department of Defense Atomic Support Agency and Advanced Research Projects Agency; Lawrence Radiation Laboratory; Sandia Corporation; and Edgerton, Germeshausen and Grier, Incorporated.

*C= complete, P= partial data, N= no data

HEBGEN LAKE
Vela Uniform Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Project Hebgen Lake Earthquake is part of the Long Range Seismic Measurements Experiment established under Vela Uniform Project 8.4, for ground-based nuclear testing verification and detection. The project involved gathering basic seismic data from an earthquake that occurred near Hebgen Lake, Montana, for comparison of seismic signatures from natural and manmade sources.
2. Location	C	The earthquake epicenter was recorded by the U.S. Coast and Geodetic Survey at 45.2°N latitude, 111.2°W longitude, approximately 25 km deep. The seismic stations were at a number of locations across the U.S.
3. Beginning Date	C	February 25, 1962, origin time 17:17:38.9 GMT is the beginning date for Hebgen Lake Earthquake project; 1961 is the beginning date for Long Range Seismic Measurements Project 8.4.
4. Fieldwork Dates	C	The date of the Hebgen Lake Earthquake was February 25, 1962.
5. Fieldwork Description	C	One permanent seismic observatory and 36 mobile seismic instrument vans distributed across the United States were used to record seismic data. The vans were temporarily positioned at selected monitoring sites. Locations for the mobile stations were selected because of proximity to known fault zones or to the Nevada Test Site. No ground disturbing activities are associated with this project.
6. Activity Level	C	Project Hebgen Lake was a Level 4 activity. Field activity for the project was based on using existing facilities for recording seismic data.
7. Ending Date	C	The final report was issued November 1, 1962.
8. Land Ownership	C	Not Applicable

Hebgen Lake Earthquake (continued)

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
9. Agencies/Companies	C	Participants included the U.S. Atomic Energy Commission; Department of Defense, U.S. Air Force Technical Applications Center; U.S. Coast and Geodetic Survey; Geotech Corporation; and Southern Methodist University.

*C= complete, P= partial data, N= no data

IKI
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	The Iki project focused on determining if the industrial use of sub-surface pools of molten rock – either natural or those that might be formed by deep underground nuclear explosions – was technically and economically feasible for geothermal power generation.
2. Location	C	The Project Iki experiment was located in Hawai'i Volcanoes National Park in the southeastern part of the Island of Hawaii. The drill site lies just east of the Kilauea volcano caldera in the Iki Crater at 19 25' N latitude, 155 15' W longitude.
3. Beginning Date	C	The initial concept was proposed shortly after the end of the November 14-December 21, 1959 eruption of the Kilauea Iki Crater. By the summer of 1960, the Plowshare researchers had developed the methodology and technical program for an experiment for the Kilauea Iki eruption.
4. Fieldwork Dates	C	Fieldwork was conducted during July 1960.
5. Fieldwork Description	C	Fieldwork consisted of drilling activities, which involved using a winch and cable system to place a Concore type E5 portable core-drilling rig on the crater floor. An air compressor positioned on the crater rim supplied the rig through a 1,400 ft long hose. Using standard drill coring bits, a 3½ -inch diameter hole was drilled using compressed air to cool the drill head and remove the cuttings. An air and water coolant mixture was needed to effectively cool the standard drilling equipment at temperatures above 850°C. In the case of the Iki lava lake, 850°C was reached at a depth of 12 ft. On July 25, 1960, the crust was pierced 19.1 ft below the surface, making it possible to take temperature measurements in the molten lava and collect samples of the melt and gases. All equipment was removed after completion of the experiment.
6. Activity Level	C	Project Iki was a Level 3 activity. Fieldwork was limited to drilling a well and setting up support and sampling equipment. The project site was visited in FY2003.

Iki (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
7. Ending Date	C	Fieldwork concluded at the end of July 1960, with final reports produced between December 1960 and March 1961.
8. Land Ownership	C	The project area fell within Hawai'i Volcanoes National Park. This land is administered by the National Park Service, U.S. Department of the Interior. The temporary special use application the U.S. Atomic Energy Commission filed with the Park Service expired shortly after Project Iki was completed.
9. Agencies/Companies	C	U.S. Atomic Energy Commission; Lawrence Radiation Laboratory, University of California, Livermore; Sandia Laboratory, Albuquerque, NM; University of California, Los Angeles; Hawaiian National Park Service; U.S. Geological Survey Volcanological Observatory; University of Hawaii; and Nat Whiton (drilling contractor), Honolulu, HI.

*C= complete, P= partial data, N= no data

KATALLA HARBOR
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Katalla Harbor was a proposal to use nuclear explosives to construct a deep-water harbor at Katalla Bay, Alaska. The conceptual design was to build an inland harbor with a channel entrance similar to a harbor design proposed for Cape Thompson (Project Chariot). At Katalla Bay, a harbor would provide a protected loading facility to transport coal and petroleum resources.
2. Location	C	The abandoned town of Katalla is in southeastern Alaska, located approximately 50 miles southeast of Cordova. The proposed site for the harbor was at the north end of Katalla Bay, north of Palm Point along the northeast side of Lake Kahuntla, less than 2 miles southwest of Katalla.
3. Beginning Date	C	The first documentation for the project occurs in newspaper articles published during July 1958. The articles report on a conference held with members from the U.S. Atomic Energy Commission and Lawrence Radiation Laboratory during a visit to the soon-to-be-new state of Alaska. During the conference, a harbor in the Gulf of Alaska at Katalla Bay was proposed.
4. Fieldwork Dates	C	Not Applicable
5. Fieldwork Description	C	The economic feasibility study and initial design concept were based on data collected from existing sources. No fieldwork was conducted as part of the harbor project.
6. Activity Level	C	Katalla Harbor was a Level 5 activity. The proposed harbor was a location where activity was confined to conceptual design and background research.

Katalla Harbor (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
7. Ending Date	C	There is no documentation for the project dating from 1960 until early 1963 and the project concept was last mentioned in 1964. This may reflect the Lawrence Livermore Laboratory's focus with studies for Project Chariot, a project that eventually stalled. The project concept for Katalla Harbor was probably dropped after activity was suspended for Project Chariot.
8. Land Ownership	C	Katalla Bay is under federal jurisdiction. The proposed project area falls within the boundaries of the Chugach National Forest on land managed by the U.S. Department of Agriculture, U.S. Forest Service.
9. Agencies/Companies	C	Participants included the U.S. Atomic Energy Commission, Plowshare Advisory Committee; Lawrence Radiation Laboratory; and Exploration Services, Incorporated.

*C= complete, P= partial data, N= no data

KAUNAKAKAI HARBOR
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	The Kaunakakai Harbor project involved the proposed nuclear excavation of a deep-draft commercial harbor. The project's purpose was to demonstrate the utility and economic advantages of using nuclear explosives in harbor construction.
2. Location	C	The location proposed for Project Kaunakakai Harbor was along the southern coast of the island of Molokai, Hawaii. The site selected for the deep-draft harbor was approximately nine miles west of the town of Kaunakakai near the small community of Kolo.
3. Beginning Date	C	The initial discussions for a nuclear excavated deep-draft harbor near Kaunakakai, Molokai occurred sometime in 1963.
4. Fieldwork Dates	C	If site visits took place, they would have occurred between late 1963 and early 1967 prior to preparation of the draft feasibility study.
5. Fieldwork Description	C	At most, fieldwork was confined to a site visit or several visits that took place sometime between late 1963 and early 1967 prior to the preparation of the draft feasibility study. The project never progressed beyond the feasibility study.
6. Activity Level	C	Project Kaunakakai was a Level 5 activity with work largely confined to concept development with a site visit(s). The proposed project area was visited in FY2003.
7. Ending Date	C	The feasibility study for the project was issued in February 1969.
8. Land Ownership	C	The project area fell along the Molokai shoreline and extended beyond the reef line approximately 1 mile offshore within an area under the jurisdiction of the State of Hawaii.

Kaunakakai Harbor (continued)

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
9. Agencies/Companies	C	The U.S. Atomic Energy Commission; U.S. Army Engineer Nuclear Cratering Group; Department of the Army Corps of Engineers, Honolulu Engineer District; and Lawrence Radiation Laboratory, University of California, Livermore were the principal project participants. Other agencies also provided input for the feasibility study. These included the U.S. Weather Bureau, the U.S. Navy Hydrographic Office, and the State of Hawaii.

*C= complete, P= partial data, N= no data

KETCH
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	<p>Project Ketch was an experiment designed to clarify several technical uncertainties and to determine if it was economically feasible to create underground gas storage with nuclear explosions. Four of the experiment's objectives were: 1) determination of the capability of the nuclear reservoir created by the detonation to store gas at various pressures, 2) determination of the volume of storage space created, 3) assessment of the feasibility of various methods for controlling and limiting the levels of radioactivity which might be introduced into gas stored in the nuclear chimney, and 4) definition of economic factors involved in this type of commercial application. Columbia Gas System Services Corporation contacted the U.S. Atomic Energy Commission regarding the company's interest in conducting this research with potential project locations within their service territories of New York, Pennsylvania, Ohio, Maryland, West Virginia, Virginia, and Kentucky. A technical approach report was prepared by the Lawrence Radiation Laboratory and was followed by a feasibility study prepared by Columbia Gas Services, the U.S. Atomic Energy Commission, the U.S. Bureau of Mines, and the Lawrence Radiation Laboratory. Pennsylvania Site No. 5, an existing location in north-central Pennsylvania, was chosen for the project. Five phases were proposed for the project and included field testing and exploratory and environmental studies (8 months), detonating the nuclear explosion (6 months), decontamination of the chamber (11 months), construction of surface facilities and extensive post-shot testing programs (6 months), and finally, plant operation experiments and evaluation reports (14 months). This State of Pennsylvania lease application for this location was withdrawn in 1968 due to the increasing public opposition. Columbia Gas Services continued to look for another location in one of the other states in their service territory until the project became inactive in late 1970.</p>

Ketch (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
2. Location	C	The location for the Ketch project was in the Sproul State Forest, Clinton County, approximately 12 miles southwest of Renovo, north-central Pennsylvania, at Pennsylvania Site No. 5. After this location was removed from consideration, no specific locations were identified for the subsequent proposed alternate location in the states of New York, Ohio, Maryland, West Virginia, Virginia, and Kentucky. However, Kentucky and West Virginia were actively seeking the project and several locations in Appalachia were under serious consideration.
3. Beginning Date	C	The concept for Project Ketch began during the spring of 1964 (no specific date).
4. Fieldwork Dates	C	In the first week of October 1965, Columbia Gas had personnel conduct a field visit to the proposed Ketch location. On June 8, 1967, various project participants and personnel from State of Pennsylvania agencies visited the proposed Project Ketch location. At least one more visit was made that month to the proposed Project Ketch location by representatives of the U.S. Atomic Energy Commission, Nevada Operations Office, its contractors, and Lawrence Radiation Laboratory. There is no record of fieldwork at the proposed alternate locations in Kentucky and West Virginia.
5. Fieldwork Description	C	In 1965, Columbia Gas obtained environmental information and inventoried and photographed all the houses within a two-mile radius and all major structures within a 20-mile radius. On June 8, 1967, representatives from the Pennsylvania Governor's Atomic Advisory Committee, Pennsylvania Bureau of Mines, Pennsylvania State University, Pennsylvania Department of Forestry and Waters, Lawrence Radiation Laboratory, U.S. Atomic Energy Commission, Nevada Operations Office, and Columbia Gas Services System Corporation visited the proposed Project Ketch location. Nevada Operations Office and Lawrence Radiation Laboratory representatives identified a potential control point location approximately 12,000 ft

Ketch (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
5. Fieldwork Description (cont.)		southwest of the proposed ground zero. At least one more visit was made that month to the proposed Project Ketch location by representatives of the Atomic Energy Commission, Nevada Operations Office, its contractors, and Lawrence Radiation Laboratory to evaluate the site and obtain sufficient information to assist with cost estimates.
6. Activity Level	C	Project Ketch was a Level 4 activity because fieldwork was confined to visual field inspections and used data from existing wells during the feasibility study.
7. Ending Date	C	In July of 1968, Columbia Gas Services Company withdrew its request to lease land for Ketch in Sproul State Forest in Pennsylvania. In 1970, after March, the Ketch project was listed as inactive.
8. Land Ownership	C	The ground zero was on State of Pennsylvania owned land in Clinton County, but the site would have extended into Centre County, within Sproul State Forest.
9. Agencies/Companies	C	The U.S. Atomic Energy Commission, Nevada Operations Office and San Francisco Operations Office; Lawrence Radiation Laboratory; Columbia Gas System Service Corporation, New York; U.S. Bureau of Mines; Holmes and Narver, Inc., MATHEMATICA, Princeton, New Jersey; U. S. Public Health Service, Southwestern Radiological Health Laboratories; Commonwealth of Pennsylvania; Pennsylvania State Foresters Office, State Health Department, Department of Forestry and Waters, Advisory Committee on Atomic Energy Development and Radiation Control; and the University of Pennsylvania.

*C= complete, P= partial data, N= no data

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LAKE TAHOE SEWAGE
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Lake Tahoe Sewage was a proposal to use large-diameter deep wells created by nuclear explosives to dispose of sewage effluent from the Lake Tahoe Basin. The concept was based on the idea that storage of sewage effluent below the regional water-table, and/or in a location where effluent would be filtered through the surrounding medium, would isolate waste material from the environment. Site selection was critical to the technical feasibility of the project because the project required a rock formation deep enough to create a nuclear chamber with sufficient size to store effluent and sufficient effective porosity and permeability to allow reasonable flow rate through the formation.
2. Location	C	The project was proposed for the basin surrounding Lake Tahoe in the Sierra Nevada Mountains of California and Nevada. Subsurface volcanic andesite formations in the north and northeast portion of the basin were considered suitable sites for the project, but no exact location was proposed for the deep injection wells.
3. Beginning Date	C	The earliest date for the proposal of using nuclear methods for sewage treatment in the Tahoe Basin is 1964. The feasibility study for a similar project in Livermore Valley was completed in 1963.
4. Fieldwork Dates	C	Not Applicable
5. Fieldwork Description	C	No fieldwork was conducted for the nuclear method. An evaluation of the geologic deposits on the northern end of the lake was based on existing documentation.
6. Activity Level	C	Lake Tahoe Sewage was a Level 5 activity. Activity for the project was confined to conceptual design and background research based on available data.

Lake Tahoe Sewage (continued)

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
7. Ending Date	C	There is no documentation proposing the nuclear method of sewage disposal for the Lake Tahoe Basin after 1964 and by 1969 treated sewage was pumped out of the basin. A 1971 summary about Plowshare methods for sewage disposal states that the use of injection wells produced by nuclear explosives was not economically feasible for the Tahoe Basin and did not provide an advantage over conventional methods.
8. Land Ownership	C	The proposed project area is a patchwork of private, state, and federally owned lands.
9. Agencies/Companies	C	The U.S. Atomic Energy Commission, Lawrence Radiation Laboratory; Engineering-Science, Inc.; and the Board of Consultants for the Lake Tahoe Area Council.

*C= complete, P= partial data, N= no data

LIBBY
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Project Libby was a U.S. Army Engineers Waterways Experiment Station Explosive Excavation Research Laboratory experiment. The objective was to demonstrate the use of high explosives to excavate a side-hill cut with a steep back slope in high-strength rock for road construction. The project was conducted as part of the relocation of Montana State Highway 37 for the Libby Dam.
2. Location	P	The Libby Dam Project is located in northeastern Montana, 17 miles upstream of Libby, Montana, on the Kootenai River. Prior to construction of the dam Montana State Highway 37 ran along the western side of the river. However, the highway would be impounded by the reservoir and was therefore relocated to higher elevation along the eastern side of what is now Lake Koocanusa. There are a number of locations where steep slopes were excavated for highway construction, but the precise location of the explosive project on the 42 mile stretch of highway between Libby Dam and the town of Rixford near the Canadian border is not known.
3. Beginning Date	C	The explosive excavation project was in the planning stages by 1971. Status reports from the Explosive Excavation Research Office indicate that a project planning meeting was held with the U.S. Army Corps of Engineers Seattle District during March 1971, and an award was made on a contract bid for the project on September 30, 1971.
4. Fieldwork Dates	P	Construction of the highway was underway by April 1972, and emplacement and firing of the pre-splitting lines for the explosive excavation had been completed. On June 8, 1972, the explosive excavation was accomplished creating a 300 ft cut on a steep slope. Post detonation construction activities were scheduled to begin once better road access was established to the project location. The details of the fieldwork and post-detonation activities are not known.

Libby (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
5. Fieldwork Description	P	Fieldwork for the explosive excavation began with drilling two rows of small diameter holes to emplace and detonate explosives to create a pre-split surface on the slope face. This was accomplished prior to the cratering experiment to avoid up-thrusting and fracturing during the cratering detonation. Following completion of the pre-split surface, a series of 3 holes were drilled and emplaced with high explosives. Detonation was accomplished on June 8, 1972. Post-detonation activities consisted of removing fractured rock and grading the surface to the desired road specifications.
6. Activity Level	C	Project Libby was a Level 2 activity; high explosives were used in the excavation.
7. Ending Date	C	The explosive excavation was executed on June 8, 1972. No documentation has been located that summarizes technical aspects of the project. In 1978, the U.S. Army Corps of Engineers, Seattle District issued a report on the highway relocation, but this document is not available, either.
8. Land Ownership	C	The explosive excavation was within the right of way for Highway 37 under the jurisdiction of the Montana Department of Transportation.
9. Agencies/Companies	P	Project participants included the U.S. Army Engineers Waterways Experiment Station Explosive Excavation Research Laboratory and the U.S. Army Corps of Engineers, and the North Pacific Division, Seattle District.

*C= complete, P= partial data, N= no data

LOST CREEK
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	The Lost Creek Project was a high-explosive blasting experiment in hard rock. The experiments included a series of single and row charge detonations to obtain information regarding: 1) the phenomenon of mounding, 2) the use of controlled blasting with concentrated explosive charges, and 3) the use of concentrated charges to produce rock fill. Mounding is an occurrence where fragmented rock from a blast is pushed upward towards the ground surface when the charge is set at a specified depth (in contrast to cratering). The project was conducted at the quarry for the Lost Creek Dam.
2. Location	C	The quarry was located on a ridge east of the Lost Creek Dam along the Rogue River in Sec. 25, T33S R1E, Jackson County, Oregon. In 1996, the dam was renamed the William L. Jess Dam and is operated by the U.S. Army Corps of Engineers.
3. Beginning Date	C	On September 2, 1971, personnel from the Explosive Excavation Research Laboratory proposed that an experiment be conducted at the quarry site for the Lost Creek Dam at a meeting held with the U.S. Army Corps of Engineers, Portland District
4. Fieldwork Dates	C	The field program began in April 1972 and the final detonation occurred on June 22, 1972. Work continued into July 1972 to relinquish the site.
5. Fieldwork Description	C	The U.S. Army Corps of Engineers conducted four main experimental test series consisting of 41 explosive single and row charge tests at the Lost Creek Dam quarry. Three different bulk explosives (two slurry explosives and ammonium nitrate fuel oil) and several cartridge explosives were used during the tests. Some of the tests were greater in magnitude than any previous high explosive tests conducted by the Explosive Excavation Research Laboratory or the Nuclear Cratering Group. Drilling included 10-inch holes for emplacement of mounding charges, 6-inch holes to emplace particle-

Lost Creek (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
5. Fieldwork Description (cont.)	C	velocity gauges, and small diameter blast holes drilled to presplit and buffer the blast experiments. Six seismic stations were placed in the area to record the blast waves. After the project was completed the area was presumably used to quarry materials for the dam, but no documentation is available to show the spatial relationship between the Lost Creek high explosive study area and the quarry for the dam.
6. Activity Level	P	The Lost Creek Project was a Level 2 activity: high explosive tests were conducted in the quarry area for the dam. Additional documentation is needed to clarify the spatial relationship between the Lost Creek Project area and quarrying activities that were conducted during construction of the dam.
7. Ending Date	C	The date of issuance of report with results of project was January 1975.
8. Land Ownership	P	Land ownership is still not determined, i.e., whether the quarry belongs to the U.S. Army Corps of Engineers, Portland District; a private enterprise belonging to the Medford corporation; or to some other agency. The quarry was within the original Lost Creek project boundaries and may be part of a land withdrawal by the U.S. Army Corps of Engineers, Portland District.
9. Agencies/Companies	C	The U.S. Army Engineer Explosive Excavation Research Laboratory and Waterways Experiment Station and the U.S. Army Corps of Engineers District, Portland, Oregon.

*C= complete, P= partial data, N= no data

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Data Quality Objectives

NAWAPA
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	The North American Water and Power Alliance, NAWAPA, was a water management proposal to collect water from Alaska and Canada and redistribute it to water-scarce areas in the western United States, Canada, and northern Mexico using a vast system of dams, reservoirs, canals, and pumping stations. The proposal also included a plan to divert water to the Great Lakes region to maintain water levels and control pollution. The nuclear component of the project proposed using nuclear energy to build dams and reservoirs, tunnel waterways, denude vegetation from reservoirs, and provide the motive force for pumping stations. According to the proposal the use of nuclear techniques would reduce construction and operating costs, and reduce construction time from the projected 30 years using conventional methods.
2. Location	C	The proposed NAWAPA system covered a vast area that included the United States west of the continental divide, the northern Plains states east to the Great Lakes, southern and eastern Alaska, western and south-central Canada, and northern Mexico. The exact details for each route in the water distribution system are not known.
3. Beginning Date	C	In July 1964, the Ralph M. Parsons Company distributed their proposal for a nuclear excavation component for the NAWAPA project to the U.S. Atomic Energy Commission.
4. Fieldwork Dates	C	Not Applicable
5. Fieldwork Description	C	Fieldwork was scheduled after funding from Congress, but apparently funding was never approved. No fieldwork activities were conducted.
6. Activity Level	C	The plan for the use of nuclear explosives to implement the NAWAPA project was a Level 5 activity. Activity was confined to developing the project concept.
7. Ending Date	C	The ending date is unknown, but is likely late 1964 or early 1965.

NAWAPA (continued)

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
8. Land Ownership	P	The land was in Canada, the United States, and Mexico and under various provincial, federal, state, and local jurisdictions as well as private ownership. The exact details for the various routes are not known.
9. Agencies/Companies	C	The Ralph M. Parsons Company; the U.S. Atomic Energy Commission, San Francisco Office; and the Lawrence Radiation Laboratory.

*C= complete, P= partial data, N= no data

NEW MADRID EARTHQUAKE
Vela Uniform Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	The U.S. Department of Defense created the Advanced Research Projects Agency to oversee the Vela Program and, under its administrative umbrella, the Long Range Seismic Measurements Program began. By early 1960, 20 mobile monitoring stations were actively recording seismic data. Within a few months, this number increased to 40. These stations formed a network designed to collect and analyze data from a series of planned domestic underground nuclear tests as well as comparative data from foreign nuclear detonations, conventional explosives, and natural seismic events. The mobile detection stations were in operation when an earthquake occurred near New Madrid, Missouri, in early 1962. Data gathered from the February 2 tremor was used for long range seismic measurements investigations.
2. Location	C	The quake's epicenter was at approximately 36°37'N Latitude 89°51' W Longitude at a depth of 4 km below the surface. The 40 mobile detection stations were distributed at various locations throughout the continental United States.
3. Beginning Date	C	The earthquake was detected at 06:43:30 GMT on February 2, 1962.
4. Fieldwork Dates	C	The New Madrid earthquake occurred on February 2, 1962 and it is likely that the mobile stations were visited shortly after the earthquake.
5. Fieldwork Description	C	As with the other long range seismic measurements earthquake monitoring efforts, field activity for Project New Madrid Earthquake was limited to the temporary placement of the mobile seismic observatories. Typically, the units were relocated shortly after recording a seismic event. Some locations, however, were reused frequently because of their proximity to the Nevada Test Site or active seismic zones.
6. Activity Level	C	The New Madrid Earthquake was a Level 4 activity due to the use of data from existing instrumentation.

New Madrid Earthquake (continued)

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
7. Ending Date	C	Data acquisition occurred on February 2, 1962 and was followed by data analysis that year.
8. Land Ownership	N	There is no information on land ownership for the monitoring stations. The epicenter of the earthquake was on private land.
9. Agencies/Companies	C	The U.S. Department of Defense and the Advanced Research Projects Agency, Nuclear Test Detection Office, project participants included the U.S. Atomic Energy Commission; the U. S. Air Force, Air Force Technical Applications Center; and the Geotechnical Corporation, Dallas, TX.

*C= complete, P= partial data, N= no data

NOME HARBOR
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Nome, on the Bering Sea Coast of Alaska, was one of four locations along the northwest coast of Alaska considered for nuclear excavation of a harbor. In the late 1950s Alaska was considered a geographic location that would be suitable for a demonstration of the practical uses of nuclear explosives, and a harbor project was considered technically feasible. By 1959, based on the results of a study on the mineral potential of Alaska and harbor locations, nuclear excavation of a harbor at Cape Thompson (Project Chariot) was selected over the other locations (Cape Darby and Point Barrow). However, in 1964 nuclear excavation of a boat harbor at Nome appears on a list of suggested nuclear excavation projects compiled by the U.S. Atomic Energy Commission, Division of Peaceful Nuclear Explosives. The existing harbor at Nome had only limited depth, and was not sufficient to meet future commercial and supply demands for the region. It appears that there may be some confusion in the documentation relating to the difference between a harbor at Nome and a harbor on the Norton Sound east of Nome at Cape Darby.
2. Location	C	A harbor at Nome was proposed for the coastal area adjacent to the city of Nome, Alaska, in the southwest Seward Peninsula on the Bering Sea.
3. Beginning Date	C	The idea of a harbor at Nome appears in 1958 documentation.
4. Fieldwork Dates	C	No fieldwork was conducted for the project.
5. Fieldwork Description	C	Not Applicable
6. Activity Level	C	Nome Harbor was a Level 5 activity. Data for analysis was obtained from published sources and other records, no field activity was conducted.
7. Ending Date	C	No documents have been located that propose a nuclear excavated harbor at Nome after 1964.

Nome Harbor (continued)

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
8. Land Ownership	C	The proposed harbor area is under federal jurisdiction. Waters in the area are part of the Alaska Maritime National Wildlife Refuge administered by the U.S. Department of the Interior, U.S. Fish and Wildlife Service.
9. Agencies/Companies	C	Participants included the U.S. Atomic Energy Commission, Division of Peaceful Nuclear Explosives; Lawrence Radiation Laboratory; and the E. J. Longyear Company.

*C= complete, P= partial data, N= no data

NORTH SLOPE HARBOR
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	The North Slope Harbor was a proposal to use nuclear explosives to construct a harbor or loading facility for ice-reinforced oil tankers that would transport oil from the North Slope of Alaska to market areas.
2. Location	C	The loading facility was to be built about 20 miles offshore in 100 ft of water, the depth necessary to accommodate oil tankers, somewhere between Prudhoe Bay and Brownlow Point along the north coast of Alaska. Offshore production of oil was expected, so there was uncertainty about the optimum location for the loading facility. A precise location for the project was not defined.
3. Beginning Date	C	The project concept began with correspondence between the U.S. Coast Guard, Lawrence Radiation Laboratory, U.S. Atomic Energy Commission, and the U.S. Army Corps of Engineers starting on September 30, 1968.
4. Fieldwork Dates	P	Drilling was planned during the late spring and summer of 1969 at various locations off the north shore of Alaska in the vicinity of Prudhoe Bay. The objective of the drilling program was to acquire geological data about the offshore deposits to study the feasibility of a nuclear option. No information is available to indicate if any drilling was conducted in 1969.
5. Fieldwork Description	P	An offshore drilling exploration program was planned for geological studies. Actual drilling operations were to begin as soon as permits were granted. The plan called for drilling four holes, two on grounded ice and two on small islands. The order of drilling would be: 1) an ice island ca. 12 miles north of Flaxman Island off Brownlow Point; 2) an ice island ca. 19 miles northwest of Midway Island; 3) Midway Island, ca. 15 miles north of Prudhoe Bay; and 4) Flaxman Island, off Brownlow Point, ca. 47 miles west of Prudhoe Bay. It is unknown if any of these drilling operations took place. Additional documentation is required.

North Slope Harbor (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
6. Activity Level	P	The North Slope Harbor was a Level 4 or Level 5 activity. Additional documentation is needed to determine if any drilling was conducted.
7. Ending Date	C	The last correspondence between the interested agencies dates to August 12, 1969 and is a letter from the Vice President of Humble Oil notifying the U.S. Atomic Energy Commission that the joint venture to study the feasibility of constructing a loading facility off the coast of Alaska had been postponed. Newspaper articles published in September suggest that there was still an interest in the project, but the project would not proceed without financial support from private agencies.
8. Land Ownership	P	Offshore lands off the north coast of Alaska are owned by the State of Alaska (some of these were put up for lease/sale in September 1969).
9. Agencies/Companies	C	The U.S. Coast Guard; U.S. Army Corps of Engineers; U.S. Atomic Energy Commission, Division of Peaceful Nuclear Explosives and Nevada Operation Office; U.S. Army Engineer Nuclear Cratering Group; Lawrence Radiation Laboratory; ESSO Production and Research (now Exxon Mobile Corporation); Standard Oil; Humble Oil and Refining Company; British Petroleum; and Dames & Moore, Inc.

*C= complete, P= partial data, N= no data

OLD RELIABLE MINE
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Ranchers Exploration and Developments Corporation decided to experiment with a new copper extraction technique. Instead of mining and hauling the ore for processing, this method focused on breaking up the ore deposits and leaching the copper in place with a solution of acid and water, substantially reducing costs. On January 27, 1972, there was a meeting to discuss the possibility of a mutual effort between the government and industry to make seismic and related measurements on this exceptionally large non-nuclear blast. The Old Reliable Mine location was in the vicinity of a possible copper leaching project using nuclear explosives that was being discussed with Newmont Mining Company. Lawrence Livermore Laboratory also saw it as an opportunity to derive data for planned and future Plowshare projects because potential seismic damage was a limiting factor on gas stimulation and Plowshare applications in general, and this was in a different geologic regime. DuPont was interested in the solution mining method of copper recovery but hesitant to proceed with the U.S. Atomic Energy Commission on such a Plowshare project because of the difficulties of working with government agencies. This was viewed as an opportunity to show the company that Plowshare personnel could work efficiently and effectively with industry. Due to low ground-motion predictions, most seismic data channels were saturated on the peak amplitudes and the data were lost. The other readings were inaccurate because of improper calibrations from an earlier detonation and from different methods of recording. Consequently, the primary objective for developing a capability to predict ground motion was not realized. Only the air blast measurement program was successful in obtaining useful data.
2. Location	C	The Old Reliable Mine is in the Galiuro Mountains at an elevation of 3,740 ft, 39.5 miles north of Tucson, Arizona. It can be reached by driving 9.3 miles up Copper Creek Road from Mammoth, Arizona to coordinates 32°45.11' North latitude and 110°29.36' West longitude.

Old Reliable Mine (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
3. Beginning Date	C	Discussions between E.I. DuPont de Nemours and Company and Ranchers Corporation, and the U.S. Atomic Energy Commission were initiated in January of 1972.
4. Fieldwork Dates	C	For the U.S. Atomic Energy Commission's recording of seismic and air blast measurements, fieldwork to identify station locations and place the instrumentation occurred between February 16, 1972 and March 9, 1972 with data collection lasting a few days past the March 9 th high explosives detonation.
5. Fieldwork Description	C	The detonation at the Old Reliable Mine occurred on March 9, 1972. The ammonium nitrate was placed in three working levels of the mine: 600,000 lbs at elevation 3,995 ft, 2,000,000 lbs at 3,835 ft, and 1,400,000 lbs at 3,735 ft. The Nevada Special Projects Party of the Environmental Sciences Laboratories instrumented 12 temporary seismograph stations ranging from 1.2 to 39.5 miles away from the detonation, the last being in north Tucson. Additional data was obtained from nine permanent stations in Arizona, New Mexico, Nevada, and Utah. Sandia Laboratories involvement focused on instrumentation for the associated air-blast measurements.
6. Activity Level	C	Project Old Reliable Mine was a Level 4 activity because the U.S. Atomic Energy Commission's involvement was confined to instrumentation and data readings.
7. Ending Date	C	The Lawrence Livermore Laboratory's report on the surface-motion data was completed on July 19, 1973. The Sandia Laboratories report on the air blast measurements was released in October of 1972.
8. Land Ownership	C	Old Reliable Mine is located on federal land under the jurisdiction of the Bureau of Land Management.

Old Reliable Mine (continued)

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
9. Agencies/Companies	C	Project participants included the E.I. DuPont de Nemours and Company; John A. Blume and Associates Research Division; Ranchers Exploration and Developments Corporation; Earth Science Division, Lawrence Livermore Laboratory; U.S. Atomic Energy Commission, Nevada Operations Office; U.S. Geodetic Survey; Sandia Laboratories; U.S. Army Engineers Explosive Engineering Research Organization; Environmental Research Corporation; Department of Commerce; and National Oceanic and Atmospheric Administration, Earth Sciences Laboratory.

*C= complete, P= partial data, N= no data

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OPERATION BREAKUP
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Operation Breakup was a project to detonate a series of small, single and row charge chemical explosives in an ice covered lake to obtain information regarding the civil application of ice cratering. The project had three goals: 1) to determine the cratering effects of single and row charges detonated below an ice layer; 2) to study bubble coalescence; and 3) to support theoretical studies of cratering physics for both conventional and nuclear explosives.
2. Location	C	The project was executed at the largest of three lakes that compose the Blair Lakes, 33 miles south southeast of Fairbanks, Alaska. The larger lake is centrally located, one mile in diameter, and a depth of 40 to 52 ft over an area 2,500 x 2,300 ft. During the winter months ice cover on the lake varied from 30 to 36 inches in thickness.
3. Beginning Date	C	The date of conceptualization of the project is unknown but probably is 1965.
4. Fieldwork Dates	C	Depth surveys of the largest of the Blair Lakes were conducted in November and December 1965. The time frame for the execution of project activities was from January 20 through March 4, 1966.
5. Fieldwork Description	C	Field activities involved depth surveys of the lake in November and December 1965. In late January and early February 1966, access roads to the lake were built, the field camp was set up, and the control point, camera shelters, and photo targets were constructed. From mid-February until early March, emplacement holes and charge emplacements followed by the detonations were conducted in three phases. Concurrent with some of the detonations was research that focused on the effects of the blasts on fish, both indigenous to the lake and imported for the test. Cages and nets were used to contain and retrieve the fish for study during and after the detonation series. The camp was demobilized on March 4, 1966.

Operation Breakup (continued)

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
6. Activity Level	C	Operation Breakup was a Level 2 activity. Conventional explosives were used in the lake to test the properties of ice cratering.
7. Ending Date	C	The U.S. Army Corps of Engineers Nuclear Cratering Group report on the project was issued on November 25, 1966.
8. Land Ownership	C	The lake and adjacent land are part of the Fort Wainwright Military Reservation and are under the jurisdiction of the U.S. Department of Defense.
9. Agencies/Companies	C	The U.S. Army Engineer Nuclear Cratering Group and Alaska Engineer District; U.S. Army, Alaska; U.S. Army Cold Region Research and Engineering Laboratory; U.S. Army Engineer Waterways Experiment Station; Lawrence Radiation Laboratory; and the State of Alaska Department of Fish and Game.

*C= complete, P= partial data, N= no data

PHAETON
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Project Phaeton was a one megaton scaling experiment. A July 1962 preliminary estimate placed the cost at 10 million dollars. In the Atomic Energy Commission's 1963 Long Range Plan for the Plowshare Program, Project Phaeton is listed as part of the experimental, nuclear excavation program slated for completion by the end of FY 1967 in support of the Isthmian Canal project. This program consisted of at least eight detonations to study the characteristics of craters produced in various geological setting in relation to the depth of burial and yield of the device. Phaeton was one of the projects to be conducted in hard rock. Site selection was expected to begin in FY 1963 and this was a joint U.S. Atomic Energy Commission and U.S. Army Engineer Nuclear Cratering Group project. A September 20, 1963, memorandum by the U.S. Army Engineer Nuclear Cratering Group shows a design deadline for Phaeton of July 1966 and detonation date of March 1967. However, by late FY 1964, no potential locations had been identified. Due to its magnitude, Project Phaeton was slated for the later stages of the Plowshare experimental excavation program and ultimately was scheduled for FY 1970 or 1971. The project was not conducted.
2. Location	C	Possible locations for the project were in three states: 1) Nevada - the Nevada Test Site, the Central Nevada Test Area, Nellis Bombing Range, Monitor Valley, and the Black Rock Desert, 2) Alaska - Amchitka Island, and 3) California - Cima Dome in the Ivanpah Mountains of the Mojave Desert. No specific locations were identified.
3. Beginning Date	C	By July of 1962, the concept for Phaeton was well-developed.
4. Fieldwork Dates	C	There is no indication of field activities.
5. Fieldwork Description	C	There was no fieldwork conducted for this project with the possible exception of a few proposed location visits.

Phaeton (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
6. Activity Level	C	Project Phaeton category of activity was a Level 5 as it never progressed beyond the conceptual stage and may have involved limited field visits to proposed locations.
7. Ending Date	C	Information on Phaeton after January 1969 has not been found and, apparently, the project was put on hold.
8. Land Ownership	C	All the locations proposed for the Phaeton project were on land under the jurisdiction of the United States government. The agencies involved were the Bureau of Land Management, the U.S. Air Force, and the U.S. Atomic Energy Commission.
9. Agencies/Companies	C	The agencies involved were the U.S. Atomic Energy Commission and Nevada Operations Office, Lawrence Radiation Laboratory, U.S Army Engineer Nuclear Cratering Group and the U.S. Geological Survey Special Project Branch.

*C= complete, P= partial data, N= no data

PINOT
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Lawrence Radiation Laboratory proposed a high explosives test in oil shale in 1959 in order to obtain data on gas evolution and migration and related health and safety issues for nuclear detonations in this media. Located near Rifle Colorado, the Pinot experiment (originally designated Pre-Vintage) was designed to provide information on the extent to which gases from a confined underground explosion in oil shale would migrate along the bedding planes. Pinot was a preliminary data gathering experiment for the proposed, but never executed, nuclear oil shale stimulation experiment Vintage.
2. Location	C	Project Pinot was located at the Anvil Points Experimental Oil Shale Station in an existing mine controlled by the U.S. Bureau of Mines. The mine was in the SW1/4, Sec. 12, T6S R95W about 2.5 miles from the Colorado River, 2 miles north of Highways 6 and 70. This location was at the southern edge of the Piceance Creek Basin in Garfield County. The Mahogany Ledge, the richest oil shale bed of the Green River Formation, occurs about 500 ft below the top of the mesa overlooking the Grand Valley of the Colorado River.
3. Beginning Date	C	The concept for Project Pinot (initially known as Pre-Vintage/pre-Pre-Vintage) originated in mid-1959.
4. Fieldwork Dates	C	Site selection began in 1959. Refurbishment and repairs to the existing mine and associated facilities took place in the spring and early summer of 1960. The project's two high explosive emplacement holes along with additional instrumentation holes were completed July 1960. The single high explosive test was conducted on August 2, 1960. The gas sampling and tracer studies were completed soon after.

Pinot (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
5. Fieldwork Description	C	The fieldwork consisted of minimal refurbishment and repairs to the Anvil Points Mine and access road. Two high explosive emplacement holes, 12 sampling bore holes, and a core hole were drilled in an existing mine adit. Geological, geophysical and hydrological characterizations of the oil shale deposit were made using the core. A single 1,000-lb chemical explosive with a small (less than 1 curie) amount of the radioactive tracer Krypton 85 was successfully detonated. Gas samples for tracer studies were obtained from the sampling holes.
6. Activity Level	C	Project Pinot was a Level 1 activity with a high explosives test containing a radioactive tracer, Krypton 85, an inert gas. The location was visited in FY 2003.
7. Ending Date	C	The first shot was conducted in August 1960. The second shot was cancelled. The final report on Project Pinot was issued in May 1961.
8. Land Ownership	C	A review of the land status records on at the Bureau of Land Management Glenwood Spring Resource Area Office confirmed that the legal jurisdiction for the Pinot Experiment Site resided with the U.S. Navy, Office of the Naval Petroleum and Oil Shale Reserves at the time of the experiment. The land was then transferred from the U.S. Navy to the U.S. Department of Energy as part of the Department of Energy Organization Act of 1977. In 1997, administrative responsibility for the land was transferred to the U.S. Department of Interior, Bureau of Land Management.
9. Agencies/Companies	C	Project participants included the U.S. Atomic Energy Commission, San Francisco Operations Office and Albuquerque Operations Office; U.S. Bureau of Mines, Laramie and Denver Offices; Lawrence Radiation Laboratory; Holmes & Narver, Inc.; U.S. Geological Survey; Sandia Corporation; and Mobil Oil Company.

*C= complete, P= partial data, N= no data

PLOWBOY
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Project Plowboy was a 1960, post-shot investigation of fractures in a salt structure from two high explosive detonations during Project Cowboy. The Cowboy detonations occurred approximately 800 ft below the surface in a section of a mine not under production, operated by the Carey Salt Company. A group of Plowshare program researchers, tasked with exploring possible industrial applications of nuclear explosions, identified the Cowboy series as an opportunity to test theoretical predictions for fracture geometry and mechanical deformation in a relatively homogeneous medium. They also believed that data obtained from the salt blasts would be applicable to the upcoming Gnome event scheduled for detonation in a Permian salt formation near Carlsbad, New Mexico. The objective was to study the phenomenology of explosions in salt, principally from a 1,000-lb high explosive 110 ft below the mine floor. The two shot locations selected for Project Plowboy were Cowboy Shot No. 4, Station 1.3 and Cowboy Shot No. 13, Station 2.5. Stations 2.4 and 2.6 were added to the project during the fieldwork and involved drilling re-entry holes. Shafts and drifts were excavated to access the other detonation zero points, expose blast-induced fractures and then trace their course. The project was completed but Station 2.6 was not accessed due to problems with the re-entry hole.
2. Location	C	Carey Salt Company mine was in a salt dome near Winnfield, Louisiana, approximately 110 miles southeast of Shreveport near the southwest corner of Sec. 19, T11N R3W. The two shot locations selected for Project Plowboy were Cowboy Shot No. 4, Station 1.3 and Cowboy Shot No. 13, Station 2.5. Stations 2.4 and 2.6 were added to the project during the fieldwork.
3. Beginning Date	C	Initial construction and support criteria for Project Plowboy were presented in a March 15, 1960 letter from Lawrence Radiation Laboratory. This was 11 days after the last Cowboy detonation.

Plowboy (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
4. Fieldwork Dates	C	Fieldwork activities at the Project Plowboy location began on April 12, 1960 with work completed on June 24, 1960. Following the end of the project, equipment was removed from the mine on June 28, 1960 with final disposition of materials completed by July 7, 1960.
5. Fieldwork Description	C	Station 2.5 was studied first. To examine the fracture zone surrounding Station 2.5, an 8x8-ft shaft was excavated to a depth of approximately 120 ft, with two horizontal drifts. Shaft excavation began on April 12, 1960 and was completed on May 13, 1960. Excavation techniques included the use of small blasts from conventional explosives. Adit excavation began immediately, with stoppage on May 17, 1960 to wait for Lawrence Radiation Laboratory personnel. Lawrence Radiation Laboratory personnel arrived on May 23, 1960 and the excavation work was completed on June 24, 1960. The material removed was hauled out of the mine to the south end of Carey Drift No. 1, approximately 90 ft. The smaller detonation at Station 1.3 was examined by taking core samples through the shot point from different directions by means of four holes. On May 24, 1960, the Waterway Experiment Station crew began setting up the drilling operation on Hole No. 1, completing it on May 31, 1960. Holes Nos. 2 and 3 were finished by June 7, 1960. Hole No. 4 was drilled on June 14, 1960. On June 8, 1960 the re-entry hole at Station 2.4 was drilled into the shot cavity. On June 9, 1960, the re-entry hole for Station 2.6 was started but missed the cavity and a second hole was drilled 1 ft away. This hole hit relief pipe installed during Cowboy and the hole was abandoned on June 13, 1960. Following the end of the project, equipment was removed from the mine on June 28, 1960, with final disposition of materials completed by July 7, 1960.
6. Activity Level	C	Project Plowboy was a Level 3 activity with drill holes and shafts constructed and used during the fieldwork.

Plowboy (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
7. Ending Date	C	Following the end of the project on June 24, 1960, equipment was removed from the mine on June 28, 1960 with final disposition of materials completed by July 7, 1960. A Holmes & Narver report on the fieldwork was produced in September 1960.
8. Land Ownership		Carey Salt Company was leasing the land from the Bureau of Land Management.
9. Agencies/Companies	C	Participants included the U.S. Atomic Energy Commission, Nevada Operations Office, Albuquerque Operations Office; Lawrence Radiation Laboratory; Dallas Laboratory; U.S. Bureau of Mines, Advanced Research Projects Agency; Carey Salt Company; U.S. Army Engineer Waterways Experiment Station, U.S. Corps of Engineers; and Holmes & Narver, Inc.

*C= complete, P= partial data, N= no data

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POINT BARROW HARBOR
Plowshare

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Point Barrow was investigated for nuclear excavation of a deep draft harbor on the coast of northern Alaska.
2. Location	C	The project location is Point Barrow, Alaska, near the town of Barrow. Point Barrow is the northernmost point of Alaska, 340 miles north of the Arctic Circle.
3. Beginning Date	C	The project began in 1958.
4. Fieldwork Dates	C	Not Applicable
5. Fieldwork Description	C	All analysis was based on existing data and no fieldwork was conducted.
6. Activity Level	C	Point Barrow Harbor was a Level 5 activity. There was no field activity for this project concept.
7. Ending Date	C	The nuclear excavation project was not pursued seriously after the 1958 report until the late 1960s when oil reserves were located and there was a need to transport oil to market. The location investigated was east of Point Barrow near Prudhoe Bay and referred to as North Slope Harbor.
8. Land Ownership	C	Point Barrow is under federal jurisdiction and is currently on land within the National Petroleum Reserve in Alaska.
9. Agencies/Companies	C	The E. J. Longyear Company; Lawrence Radiation Laboratory; and the U.S. Atomic Energy Commission, Division of Peaceful Nuclear Explosives.

*C= complete, P= partial data, N= no data

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PORT MOLLER
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	The scope consisted of a proposed nuclear excavation of a canal across the Aleutian Peninsula near Port Moller, Alaska. The project objective was to demonstrate the practicality of creating a sea-level channel using nuclear explosives to connect two major bodies of water in Alaska.
2. Location	C	The project location was Port Moller, Alaska. The planned canal site extended from Herendeen Bay through Deer Valley into Kagayan Flats terminating either in Beaver Bay or Left Hand Bay. The proposed canal project area was approximately 12.5 miles long by 1 mile. The proposed canal itself was 12.5 miles long by 1,200 ft in width and a minimum depth of 40 ft.
3. Beginning Date	C	The preliminary operational concept was proposed August 25, 1958.
4. Fieldwork Dates	P	The Phase I Field Survey was scheduled for May-September 1959 and Phase II Construction and Detonation was scheduled for November 1959 to December 1960. It is unknown if any of the Phase I Field Survey site characterization studies ever took place.
5. Fieldwork Description	C	Phase I Field Survey activities were to include surface and subsurface geological characterization studies, hydrological investigations, detailed charting of off-shore current and silting patterns, aerial photography, contour mapping, and the construction of a pre-fabricated housing, office and workshop complex, as well as a dock facility. Preliminary high explosive tests were also planned for the Alaska project site prior to Phase II in order to predict crater sizes. Phase II activities involved drilling the device emplacement holes, construction of scientific stations, establishment of radiological control areas and an on-shore firing control point, and a post-shot survey of the project area. There is no indication that any of the Phase I Field Survey site characterization studies, high explosive tests, or Phase II construction activities took place.

Port Moller Canal (continued)

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
6. Activity Level	C	Port Moller Canal was a Level 5 activity. No known field activities were conducted.
7. Ending Date	C	It is not known when the project planning activities were abandoned. There is no documentation that discusses the operational concept issued in 1958, although the project is listed as a possible demonstration project in documents dating to 1963 and 1964. The project was never executed.
8. Land Ownership	N	Unknown
9. Agencies/Companies	P	The U.S. Atomic Energy Commission, Washington D.C. and Albuquerque Operations Office; University of California Radiation Laboratory; and the State of Alaska, Governor's Office.

*C= complete, P= partial data, N= no data

PRE-DRIBBLE
Vela Uniform Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Operation Pre-Dribble was a high explosive detonation program to obtain seismic effects data from the Tatum Salt Dome area before the three planned nuclear detonations (Salmon, Sand, and Tar) under the Vela Uniform Dribble Program. Charges consisted of different types of high explosives and ranged from 50 to 1,000 pounds.
2. Location	P	Twenty detonations occurred near the towns of Collins, McNeil, Raleigh, and Ansley, Mississippi with several on or near the Tatum Salt Dome. Collins, McNeil and Raleigh are from 40 to 80 miles north of Tatum Salt Dome. Ansley is about 90 miles south near the Gulf Coast. Information about 15 of the detonations is available, but detailed location data is only documented for the test holes on the Tatum Salt Dome. Instrumentation locations are unknown also.
3. Beginning Date	C	No information is available on conceptual and planning activities prior to fieldwork, but they were likely proposed during the 1962-1963 time frame.
4. Fieldwork Dates	P	Fieldwork occurred from April through June 1963 for the explosive tests. No dates are available for the site visits or the selection and drilling program.
5. Fieldwork Description	P	Two tests were conducted in sedimentary deposits off the dome: McNeil 1 and Collins 2. The McNeil 1 test had two charges (Hole 1, 550-lb charge, Hole 2, 450-lb charge), and occurred on April 5, 1963, near McNeil, both at a depth of 245 ft. Near Collins, four detonations (Hole 2, 350-lb charge; Hole 3, 50-lb charge; Hole 4, 200-lb charge; and Hole 5, 400-lb charge) were conducted as part of the Collins 2 test on April 6, 1963, all at a depth of 195 ft. Three tests were conducted in sedimentary deposits near the dome: Dribble 5, Dribble 6, and Dribble 3A. Dribble 5 occurred on April 5, 1963 with two charges (Hole 14, 500-lb; and Hole 15, 500-lb) both at 250 ft. Two explosives were used for the Dribble 6 test (Hole 16, 500-lb and 150-lb) on April 6, 1963 at 250 ft.

Pre-Dribble (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
5. Fieldwork Description (cont.)		The Dribble 3A test on April 24, 1963 had a total charge of 1000 lbs, although the number of holes and depth and charge distribution is not known. Finally, three tests (E-1 #2, E-12, and E-13) were conducted in salt on Tatum Dome. Test E-1 #2, on May 9, 1963, consisted of a 985-lb charge at 2092 ft. Both the E-12 and E-13 tests were 1,000-lb explosives at depths of approximately 2860 ft, detonated on June 13, 1963. No additional information on tests near Raleigh and Ansley has been located. Also, no documentation has been located for site selection, site visits, and drilling activities.
6. Activity Level	C	Pre-Dribble was a Level 2 activity. High explosives were used to test for seismic effects. Documentation is not available that shows the precise location for tests conducted in locations off the Tatum Salt Dome.
7. Ending Date	C	The series of detonations which were part of the eight 1,000 pound high explosive tests are detailed in an August 1963 report.
8. Land Ownership	P	Shots fired on the salt dome are within the Tatum Dome Leasehold of Lamar County. The surface of Tatum Salt Dome was leased by the U.S. Government from Tatum Lumber Company and the Bass Pecan Company for 10 years with annual renewal options at the end of the lease term. Mineral rights were obtained through negotiation or condemnation proceedings with landowners. The Federal Court at Jackson, Mississippi issued the Order of Possession on December 21, 1962. The location of the Pre-Dribble tests on the Tatum Dome is the location of the Salmon Test Site Area. As of October 1, 2006 the Department of Energy Office of Legacy Management has been responsible for a Long-Term Surveillance and Maintenance Plan for the site. Land ownership of other high explosive detonation sites is unknown.
9. Agencies/Companies	C	U.S. Atomic Energy Commission; U.S. Department of Defense, Advanced Research Projects Agency; U.S. Geological Survey; U.S. Coast and Geodetic Survey

*C= complete, P= partial data, N= no data

PRE-GNOME
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Project Pre-Gnome was a seismic study conducted prior to Project Gnome, a nuclear experiment designed primarily for studying the feasibility of converting nuclear explosive energy into heat for the production of electrical power. Other objectives for the test included investigating the viability of recovering radioisotopes from the underground cavity that could be used for scientific and industrial applications, contributing important data on underground nuclear detonations in a new medium (salt), and making neutron measurements that would contribute to scientific knowledge and the reactor development program. The U.S. Geological Survey conducted the Project Gnome site selection study in the spring and early summer of 1958. Sites in salt beds in the Gulf Coast, Michigan, Colorado, and New Mexico were considered with the final choice in southeastern New Mexico, 25 miles southeast of Carlsbad in Section 34, T23S, R30E, in Eddy County. After the Pre-Gnome tests, the high explosives site could be converted to the device room for the Gnome event. The Project Pre-Gnome high explosive tests were conducted on February 10, 1959 (180 lbs), February 12, 1959 (750 lbs), and February 16, 1959 (6,260 lbs). All three were Pelletol or pelletized TNT charges, detonated at the bottom of the 1,200-ft hole. The analysis of the seismic data concluded that a 9-kt shot of TNT at the Gnome site would produce particle velocities and accelerations in the nearest potash mine at levels below a 75-lb dynamite blast, 90 ft away in the mine. After the Pre-Gnome tests, the high explosives site were converted to the device room for the Gnome event.
2. Location	C	The Pre-Gnome location was in southeastern New Mexico, 25 miles southeast of Carlsbad in Sec. 34, T23S R30E, in Eddy County.

Pre-Gnome (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
3. Beginning Date	C	At a November 19, 1958 Project Gnome meeting in Carlsbad, the panel recommended that an initial study be conducted prior to the Gnome event. At a meeting of the Atomic Energy Commission and the Potash Industry in Carlsbad on November 21, 1958, the decision was made to perform a series of chemical high explosive tests at the Gnome site, called Pre-Gnome.
4 Fieldwork Dates	C	Fieldwork for Pre-Gnome began December 15, 1958 and was completed on February 16, 1959.
5. Fieldwork Description	C	Fieldwork involved drilling the emplacement hole, setting up the seismograph recording system, and conducting three high explosive detonations.
6. Activity Level	C	Project Pre-Gnome was a Level 2 activity that concluded with high explosive detonations.
7. Ending Date	C	Project fieldwork ended on February 16, 1959 with reports prepared the same year.
8. Land Ownership	C	The land was under the jurisdiction of the Bureau of Land Management and, now is under the U.S. Department of Energy, Office of Legacy Management, Grand Junction, Colorado.
9. Agencies/Companies	C	Project participants included the U.S. Atomic Energy Commission, Albuquerque Operations Office and San Francisco Operations Office; Lawrence Radiation Laboratory; Sandia Corporation; U.S. Army Engineer Waterways Experiment Station; U.S. Coast and Geodetic Survey; U.S. Geological Survey; Shell Development Company; International Minerals and Chemical Corporation; United States Potash Company; Duval Sulfur and Potash Company; Reynolds Electrical and Engineering Company; Holmes & Narver, Inc.; and Edgerton, Germeshausen, and Grier, Inc.

*C= complete, P= partial data, N= no data

PRE-GONDOLA
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	<p>Project Pre-Gondola was a phased series of chemical high explosive single- and row-charge cratering experiments conducted in northeastern Montana in the weak, wet clay-shale formations near the Fort Peck Reservoir. The project was part of the joint U.S. Atomic Energy Commission-U.S. Army Corps of Engineers nuclear excavation Plowshare research program and focused on acquiring data for a medium likely to be encountered in the actual nuclear excavation of an Isthmanian Canal. Pre-Gondola was designed to investigate the cratering characteristics and behavior associated with large-scale explosions in a saturated medium. It was to serve as a precursor to the proposed Project Gondola nuclear excavation experiment that was planned for another wet, clay shale location in eastern Montana, Nevada or South Dakota.</p> <p>The experiment consisted of a total of 11 experimental test series including; 1) a seismic calibration series of 4 small 0.5-ton single charge detonations; 2) a calibration series of 4 20-ton single charge detonations; 3) a decoupling experiment with 2 single charge detonations; 4) a single row-charge detonation with a 5 charge array; 5) three, triple-row, two-pass arrays using 21 64-lb charges each; 6) a series of nine 64-lb calibration shots; 7) eight 1-ton single charge calibration shots; 8) a triple-row, two pass row test using a 21 charge array with a 21-ton total yield; 9) a single row-charge detonation with a 7 charge array; 10) a pair of row charges using 1 ton charges; and 11) a single row-charge detonation with a 5 charge array. Yields for the chemical explosive charges ranged from 0.5 tons to 40 tons. The end result of the experiment was the creation of a manmade inlet/channel along the shore of the reservoir.</p>
2. Location	C	<p>The Pre-Gondola project area is along the edge of the Fort Peck Reservoir in Valley County in northeastern Montana. The project area is approximately 17 miles south of the town of Glasgow and 10 miles west-southwest of the community of Fort Peck. The</p>

Pre-Gondola (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
2. Location (cont.)		experiment site sits at the junction of the south fork of Duck Creek and its inlet into the reservoir in Sec. 11, T25N R39E.
3. Beginning Date	C	The concept for Pre-Gondola originated in 1965. The search for an appropriate test venue began in January 1966 with background office research and field reconnaissance.
4. Fieldwork Dates	C	Site selection field evaluations were conducted during February and March 1966 and resulted in the identification of the primary site at Fort Peck Reservoir, Montana. Geologic and hydrologic characterization studies continued through the spring with the Fort Peck location confirmed in June 1966. The first seismic calibration series of detonations began in June 1966 with subsequent blast series conducted throughout the remainder of 1966 and during 1967 and 1968. The last series of high explosive detonations occurred in October 1969, with the post-shot investigations completed by early 1970. U.S. Army Corp of Engineers personnel returned to the Fort Peck Reservoir in the spring and summer of 1972 to clean up the Pre-Gondola, Trencher and Diamond Ore experiment sites.
5. Fieldwork Description	C	Field activities and facilities associated with the project included grading and leveling of portions of the site area, grading multiple dirt access roads, and drilling the 49 separate emplacement holes for the chemical charges. Facilities erected included the drill rig, several mobile support trailers, multiple camera stations, numerous instrument stations, water tanks, fuel tanks, and a barb wire fence surrounding the explosive storage area. Most of the support trailers and portable equipment was removed after the post-shot studies concluded in early 1970. Some additional equipment and structures were removed and some craters were backfilled during the site clean-up in 1972. However, the May 2004 field visit revealed that many of the craters are still visible and debris

Pre-Gondola (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
5. Fieldwork Description (cont.)		from the experiment that had previously covered by the reservoir has been exposed because of the receding water level due to a prolonged drought.
6. Activity Level	C	Project Pre-Gondola was a Level 2 activity. Conventional chemical explosives were used for all of the calibration detonations and explosive excavation experiments. The Pre-Gondola site was visited in FY2004.
7. Ending Date	C	The last series of chemical high explosive blasts occurred in October 1969 with on-site post-shot investigations completed by early 1970. Some site clean-up was completed in the spring and summer of 1972. The final project reports were issued in 1972.
8. Land Ownership	C	Records research at the U.S. Army Corps of Engineers, Fort Peck Field Office and the Montana State Office of the Bureau of Land Management in Billings confirmed that the Pre-Gondola project site lies entirely within the land withdrawn for the reservoir and is administered by the U.S. Army Corps of Engineers. The surrounding land is part of the Charles M. Russell National Wildlife Refuge.
9. Agencies/Companies	C	The U.S. Army Corps of Engineers Nuclear Cratering Group; U.S. Army Engineer Waterways Experiment Station; U.S. Army Corps of Engineers, Omaha Engineer District; Lawrence Radiation Laboratory; U.S. Atomic Energy Commission, Nevada Operations Office; Stanford Research Institute; Montana State University; Sandia Laboratories; Environmental Sciences Services Administration, Air Resources Field Research Office; Edgerton, Germeshausen and Grier; U.S. Bureau of Mines; Army Ballistics Research Laboratory; Air Force Weapons Laboratory; Montana State Fish and Game Department; Mile High Drilling Company, Inc.; Valley Electric Cooperative, Inc.; and Continental Engineers, Inc.

*C= complete, P= partial data, N= no data

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PRE-SCHOONER II
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Pre-Schooner II was a high explosive evaluation experiment conducted to help eliminate some of the uncertainty associated with crater dimension predictions in a hard, dry rock medium. In addition, Pre-Schooner II was a correlation shot for the proposed Schooner nuclear event in the same rock formation on the Bruneau Plateau in southwestern Idaho. The experiment objectives were: 1) improve knowledge of cratering in a hard, dry rock and to provide information for the emplacement design and operational safety for the Schooner event; 2) provide data on cratering physics that could be used in theoretical calculations programs; 3) give agencies an opportunity to test new scientific instrumentation and techniques to evaluate their suitability for nuclear cratering tests; and 4) provide data on the engineering properties of the crater for studies regarding the engineering usefulness of explosion-produced craters. Pre-Schooner II was considered part of the joint Atomic Energy Commission – Corps of Engineers nuclear excavation research program.
2. Location	C	The Pre-Schooner II location was on the Bruneau Plateau, 40 miles southwest of Bruneau, Idaho, approximately 7,600 ft southwest of the proposed Schooner location on land administered by the Bureau of Land Management. The Pre-Schooner II emplacement hole was located at coordinates longitude W115°34'25.203", latitude N42°24'02.943" (N267,639.53 and E547,783.11, modified Idaho State Coordinate System).
3. Beginning Date	C	The initial request for the Pre-Schooner II experiment was made by the Nuclear Cratering Group in January 1965.

Pre-Schooner II (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
4. Fieldwork Dates	C	Fieldwork specifically focused on the Pre-Schooner II chemical high explosive experiment began in the early summer of 1965, although characterization studies and geological drill hole investigations began for the Schooner nuclear experiment in the same area in late 1963. The Pre-Schooner II detonation took place in Sept 1965, with the post-shot investigations completed by 1966.
5. Fieldwork Description	C	Project Pre-Schooner II consisted of one main 100-ton subsurface detonation and two smaller 1.2-ton calibration detonations. Fieldwork conducted in support of the experiment included drilling of several exploratory geological characterization drill holes, clearing a 1,000 ft diameter work area around ground zero, drilling a 36-inch diameter explosive emplacement hole, erecting temporary support facilities (i.e., control point, camera stations, helipad, mobile trailers, storage sheds/areas, instrument stations, etc.), and creating a network of graded dirt roads linking the support facilities. Post shot activities involved crater analyses that required the excavation of several trenches through the crater lip and in the ejecta. Site clean up included removal of support buildings, instrumentation, and filling the instrument gage station drill holes.
6. Activity Level	C	Project Pre-Schooner II was a Level 2 activity with fieldwork consisting of various drill holes and the chemical explosive detonations. The Pre-Schooner II site was visited in FY 2004.
7. Ending Date	C	The high explosive test was completed in September 1965. Final clean up of the equipment, instrumentation, and temporary structures took place during 1966. The various project reports were issued in between mid-1966 and October 1968.
8. Land Ownership	C	The U.S. Atomic Energy Commission obtained a special use permit from the Bureau of Land Management for the area surrounding the Pre-Schooner II site and the proposed Schooner site in 1965. The permit was allowed to expire in 1968 and the land reverted to the legal jurisdiction of the Bureau of Land Management. There are no outstanding land status issues for the Pre-Schooner II experiment site or the proposed Schooner experiment site.

Pre-Schooner II (continued)

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
9. Agencies/Companies	C	U.S. Army Engineer Nuclear Cratering Group; U.S. Atomic Energy Commission; U.S. Army Engineer Waterways Experiment Station; U.S. Army Corps of Engineers, San Francisco District; Lawrence Radiation Laboratory; Livermore; Sandia Corporation; U.S. Weather Bureau; U.S. Coast and Geodetic Survey; Edgerton, Germeshausen, and Grier; Western Construction Company, Boise, ID; Johnson, Underkofler and W.W. Briggs Consulting Engineers, Boise, ID; and Aerial Mapping Co., Boise, ID.

*C= complete, P= partial data, N= no data

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R. D. BAILEY LAKE
Plowshare Program

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
1. Purpose/Scope	C	High explosives experiment for a pilot study for excavation of a spillway at the site of the R. D. Bailey Lake Project dam. The primary objective was to obtain data that could be used to determine an effective and economical method for excavation of the spillway. Specifically, the project was designed to study the use of large charges of bulk explosives in larger than normal sized blast holes to develop specifications that would serve as a guideline for construction of the spillway at R. D. Bailey. In addition, the experiment was designed to provide data on blasting techniques and effects for future explosive excavation research projects. A number of programs were carried out in conjunction with the explosive experiment including: studies of rock fragmentation, seismic motion studies, and collection of close-in subsurface ground shock data and airblast overpressure measurements.
2. Location	C	The spillway for the R. D. Bailey Lake Project is located about 1 mile northeast of the town of Justice, West Virginia about 100 miles southeast of Huntington. The dam is on the Guyandotte River in Mingo County and the reservoir is located within Wyoming County, West Virginia.
3. Beginning Date	C	A status report with an effective date of September 30, 1972 indicates that planning for the explosive experiment was underway by that time.
4. Fieldwork Dates	C	The experimental excavation program was conducted from February to August 1973. The first blast was on April 6 and the final blast was on July 12.

R. D. Bailey (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
5. Fieldwork Description	C	The project included fifteen test blast series, with nine primary blasts. The blasts were conducted in five levels, and each level had a blast design to investigate various configurations of blast hole diameter, depth, spacing, delays and explosive type. Overburden was removed with a D-8 bulldozer after each major blast series. In weathered shale deposits ripping was employed. Both blasted rock and ripped material were used to construct test fills for the dam. Two types of explosives were used for the pilot excavation: ANFO and aluminized ammonium nitrate slurry. The explosive excavation resulted in a cut 300 ft in length and 175 ft deep. The details of the major blast series are included in the June 1975 technical report.
6. Activity Level	C	High explosives were used in the experimental pilot excavation making this project a Level 2 activity.
7. Ending Date	C	The experimental excavation was completed during August 1973. The final report for the project was issued in June 1975. Construction of the dam began in 1974 and was completed in 1980.
8. Land Ownership	C	The project was conducted in the area that is now the spillway for the dam for the R. B. Bailey Lake Project. R.D. Bailey is a unit in the U.S. Army Corps of Engineers Ohio River Basin Flood Control System and is administered by the Huntington District.
9. Agencies/Companies	C	Participants in the project were the U.S. Army Engineer Waterways Experiment Station Explosive Excavation Research Laboratory: U.S. Army Corps of Engineers, Huntington District and the Dow Chemical Corporation.

*C= complete, P= partial data, N= no data

RAMPART CANYON DAM
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	The project concept was to use nuclear construction techniques in the construction of a dam across the Yukon River at Rampart Canyon, and to use nuclear quarrying to provide aggregate for the dam. The canyon dam would create a reservoir that would measure 280 miles long with a surface area of about 10,500 square miles. It was projected that the dam would have an installed capacity of 5 million kilowatts of power, twice the hydroelectric power generated by the Grand Coulee Dam in eastern Washington.
2. Location	C	Rampart Canyon is about 100 miles northwest of Fairbanks on the Yukon River, flowing west from Canada into Alaska. The canyon is 750 miles from the mouth of the Yukon and 510 miles from the Alaska-Canada border. The dam was to be built approximately 25 miles southwest of the town of Rampart, just below the confluence of Texas Creek. The quarry was planned for an area about 4 miles southwest of the site for the dam.
3. Beginning Date	C	The project was suggested at a conference held at the University of Alaska during July 1958.
4. Fieldwork Dates	N	It is not known if any fieldwork was conducted in support of this project.
5. Fieldwork Description	N	Data for the study of a nuclear quarry were from a report on Rampart Canyon and Dam prepared by the U.S. Army Corps of Engineer, Alaska District. This report was not published, and is not available. It is not known if any fieldwork was conducted in support of Alaska District feasibility study.
6. Activity Level	C	Rampart Canyon was a Level 5 activity. Activity was limited to conceptual design, background research, and possibly field visits. Liability is low.

Rampart Canyon Dam (continued)

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
7. Ending Date	C	The last reference to the use of nuclear excavation technology for the Rampart Canyon Dam is a 1965 study that compared methods of producing aggregate for the dam. By 1967, the U.S. Department of the Interior, Bureau of Reclamation, recommended that construction of a dam at Rampart Canyon be dropped from further consideration.
8. Land Ownership	C	The land and water in the proposed project location are under federal jurisdiction.
9. Agencies/Companies	C	The U.S. Army Corps of Engineers, Alaska District; Lawrence Radiation Laboratory; U.S. Atomic Energy Commission, Division of Peaceful Nuclear Explosives; U.S. Department of the Interior, Bureau of Reclamation; and U.S. Fish and Wildlife Service.

*C= complete, P= partial data, N= no data

RED LAKE GAS STORAGE
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	The Red Lake Gas Storage project was a proposal to create underground gas storage using nuclear explosives. In the late 1960s, El Paso Natural Gas Company conducted studies to find a location for underground gas storage in the vicinity of two major east-west crossover lines in southern Arizona near the California boarder. Initial effort focused on finding an aquifer for gas storage, but failed. Subsequently, attention turned to investigating the use of nuclear explosives to create a cavern in salt formations recently discovered in the area.
2. Location	P	A number of locations were studied for the gas storage project, and two stratigraphic test wells were drilled: one at Bullard Wash (Sec. 4, T10N R10W, Yavapai County) and another at Red Lake (Sec. 21, T26N R16W). Geologic exploration and drilling revealed that a project in the Red Lake salt formation was favorable. The Red Lake salt formation is located in Hualapai Valley, north of Kingman, in Mojave County, Arizona. A decision concerning the precise location for the project was awaiting additional information from seismic studies as well as obtaining surface and mineral rights. It is not known if there was a final decision concerning the project location.
3. Beginning Date	C	The idea of using nuclear explosives to create an underground storage reservoir in northwestern Arizona began in 1968. By November 1970, the Red Lake salt formation was the focus for the location of the project.
4. Fieldwork Dates	P	By the end of 1970, El Paso Natural Gas Company had completed geophysical explorations and/or drilling at four proposed locations for the gas storage project. The precise dates for fieldwork activity are not known.

Red Lake Gas Storage (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
5. Fieldwork Description	C	Fieldwork included geophysical explorations at four locations: Red Lake, Buck Mountain Wash, Bullard Wash, and Butler Valley. Drilling was conducted at Red Lake and Bullard Wash to determine the presence and depth of salt deposits. The test well at Bullard Wash was terminated after drilling through 4,000 ft of low density tertiary deposits. A halite deposit was encountered during drilling at Red Lake at 1,786 ft below the surface and continuing beyond the depth of the drill hole at 5,984 feet.
6. Activity Level	C	Red Lake Gas Storage was a Level 4 activity. Research by Lawrence Radiation Laboratory was confined to existing data from a test well drilled by El Paso Natural Gas Company in the Red Lake salt formation.
7. Ending Date	P	The most recent documentation for the plan to construct an underground natural gas storage facility at Red Lake using nuclear explosives is dated November 1970. Plans to move forward with the project and to make a formal proposal to the U.S. Atomic Energy Commission were awaiting the completion of negotiations to acquire land and mineral rights. The outcome of the negotiations and/or El Paso's plans for the gas storage project after 1970 are not known.
8. Land Ownership	C	There is no documentation to suggest that El Paso ever obtained mineral rights for any specific location within the Red Lake salt formation. However, the Red Lake Gas Storage Project, including the rights for a salt cavern gas storage facility, was purchased from Southwest Gas Corporation by Aquila, Inc. in 2002.
9. Agencies/Companies	C	El Paso Natural Gas Company; U.S. Atomic Energy Commission, Nevada Operations Office; Sandia Laboratories; and Lawrence Radiation Laboratory.

*C= complete, P= partial data, N= no data

RUFUS
Vela Uniform Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	The main purpose of Project Rufus was to select and evaluate one or more sites suitable for the surface detonation of nuclear explosives of at least one megaton or greater. Other considerations were to be able to test the effects of a nuclear explosion on a Minuteman Missile System, to record electromagnetic and seismic effects (Vela Uniform), conduct effects tests of nuclear explosions, device testing, and Plowshare experiments. The Plowshare experiments were not described in the documents and were not the focus of the Rufus project. Suitable sites for evaluation were limited to the continental United States, its possessions, and areas under its control. Certain foreign areas were identified, but were not seriously considered within the scope of this project. After the study and elimination of a number of locations, the Larkspur study was initiated to conduct further evaluations of three sites in Alaska. Before the Test Ban Treaty was signed on August 5, 1963, the field investigations started on two of the areas, and the field operations were canceled. In the summer of 1964, field investigations were undertaken on Amchitka Island for another project, Long Shot, and provided the opportunity to complete the Amchitka portion of Larkspur.
2. Location	C	An overall comparative evaluation was conducted of the Alaskan sites. The four sites were the upper Holitna River area, Chirikof Island, the northern foothills of the Brooks Range, and Amchitka Island. The Brooks Range and Amchitka Island locations were recommended for further studies. Four areas on Amchitka Island were extensively studied under Larkspur.
3. Beginning Date	C	In the fall of 1962, the U.S. Defense Atomic Support Agency made a request to the U.S. Atomic Energy Commission, Nevada Operations Office for the study.
4. Fieldwork Dates	C	Fieldwork was conducted on Amchitka for Larkspur in the summer of 1964 and included drill holes and testing activities.

Rufus (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
5. Fieldwork Description	C	Each of the four locations was studied intensively under Larkspur and activities included drilling holes to the depth of Minuteman missile silos and conducting associated tests.
6. Activity Level	C	The activity level for Project Rufus was a Level 3 because the field activities involved drilling test holes and conducting other test activities.
7. Ending Date	C	There is no documentation after the 1966 report on the Larkspur study of Amchitka Island.
8. Land Ownership	C	Amchitka Island is under federal jurisdiction.
9. Agencies/Companies	C	The U.S. Atomic Energy Commission; Nevada Operations Office; the Defense Atomic Support Agency; the U. S. Geological Survey; the U.S. Army Corps of Engineers; the U.S. Public Health Service; the U.S. Weather Bureau; Lawrence Radiation Laboratory; Reynolds Electrical & Engineering Company, Inc.; Holmes & Narver, Inc.; Sandia Corporation; the University of California at Los Angeles; and the University of Washington.

*C= complete, P= partial data, N= no data

SAN CLEMENTE ISLAND
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	The project was a proposed nuclear aquifer development experiment on San Clemente Island. The concept involved the creation of an underground reservoir or aquifer for the capture and storage of rainwater to provide a fresh water supply on the island.
2. Location	C	San Clemente Island, California, is approximately 70 miles from San Diego and 56 miles from Long Beach. Two basins on the west side of the island were selected as possible locations for aquifer development. One was about 8 miles and the other about 9 miles south of Wilson Cove.
3. Beginning Date	C	The initial concept was proposed in the fall of 1958 with the first field studies occurring in the winter of 1958 to 1959.
4. Fieldwork Dates	C	Personnel from the U.S. Department of Agriculture and the U.S. Navy completed initial water infiltration and soil moisture studies during winter of 1958-1959. Stanford Research Institute conducted additional geologic studies in 1959.
5. Fieldwork Description	P	Fieldwork included establishment of meteorological stations, water infiltration experiments, and geological characterization studies. The exact nature of most of these studies is unknown, but ground disturbing activities seem minimal for the meteorological and infiltration studies. The initial geological work involved the stereoscopic analysis of aerial photographs of the island and field visits to develop geological maps identifying rock types and fault zones in and around the project areas. A comprehensive drilling program to obtain core samples and subsurface hydrological data was recommended in December 1959, but it is unknown if it ever took place.
6. Activity Level	P	San Clemente was a Level 5 or Level 4 activity. Most of the activity for this project was based on the collection of geological and hydrological data that likely involved

San Clemente Island (continued)

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
6. Activity Level (cont.)		minimal ground disturbing activity. There is no documentation to suggest that the proposed drilling program was implemented.
7. Ending Date	C	No documents pertaining to the San Clemente project after February 1960 have been found.
8. Land Ownership	C	San Clemente Island was and is administered by the U.S. Navy.
9. Agencies/Companies	C	Participants in the project included the U.S. Atomic Energy Commission, Washington D.C.; Lawrence Radiation Laboratory; U.S. Department of Agriculture; U.S. Navy; and Stanford Research Institute.

*C= complete, P= partial data, N= no data

SAND
Vela Uniform Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Sand was one of three nuclear detonations (Salmon, Sand, and Tar) planned under the Dribble Program. The purpose of Dribble was to increase the U.S. capability to detect, identify, and locate underground nuclear detonations with seismic instrumentation and an experimental explosive program. Salmon (5 kiloton) and Tar (100 ton) were designed to be tamped (explosive charge emplaced in as small a shot chamber as possible) tests and Sand (100 ton) was a decoupled (explosive charge set apart from the surrounding earth) test. Sand was planned as a decoupled test in the center of a spherical cavity, approximately 2,000 feet below the surface in a salt environment.
2. Location	C	The original location for Sand was the Dribble Project area at Tatum Salt Dome in Lamar County, Mississippi, 130 miles northeast of New Orleans, Louisiana and 33 miles southwest of Hattiesburg, Mississippi. However, when water seepage problems were encountered at Tatum Salt Dome during drilling of Station 3 for the Sand event a Texas location, Hockley Mine, in the Hockley Salt Dome, was evaluated as a possible alternative site for the experiments. The Hockley Mine is five miles south of Hockley in Harris County, approximately 35 miles northwest of Houston. At Tatum Salt Dome drilling problems were studied, and an alternate drilling plan was proposed (Station 3a). Discussions allude to conducting Tar and Sand at Tatum instead of the Hockley Mine.
3. Beginning Date	C	In the 1962 revision of the Dribble Program scope a 100 ton decoupling experiment was planned. Documentation referring specifically to the name Sand for the decoupled experiment appears in 1963.
4. Fieldwork Dates	C	The exact location for Sand was identified at Tatum Salt Dome by March 1963 (Station 3) and fieldwork took place through early 1964. The location was revised in 1964

Sand (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
4. Fieldwork Dates (cont.)		(Station 3a). Proposed locations at Hockley Salt Dome were identified in May 1964. No known fieldwork was conducted at the revised location at the Tatum Dome or the Hockley location.
5. Fieldwork Description	C	In 1963, two high explosives tests were conducted at Tatum Salt Dome near the Sand and Tar emplacement locations in order to calibrate the seismic signals before both tests. Fieldwork at Station 3 included drilling an access shaft to 950 feet with 70 inch inside diameter steel casing. A ventilation shaft was drilled to 2,087 feet and cased to 1,643 feet. Attempts to seal the shafts from water were unsuccessful and the station was abandoned. It is not known if any fieldwork was conducted at an alternate location, Station 3a. In 1964, Nevada Operations Office conducted preliminary fieldwork for the conceptual engineering and construction plan for the Sand and Tar detonations at Hockley salt dome. Access to the salt deposit was planned through an existing mine shaft. There is no evidence that ground-disturbing studies were undertaken at the Hockley location as part of the Dribble program.
6. Activity Level	C	The project was a Level 4 activity for the Hockley Salt Mine, where a pre-existing mine shaft was planned for access to construct the Sand cavity and for geological studies.
7. Ending Date	C	Of the documents available, those with a date later than August 1964 do not mention Sand and/or Tar. There is no information to suggest that these tests were ever conducted or when the decision was made to cancel the tests. Other tests occurred at the Tatum Salt Dome: the nuclear Salmon event in 1964, the nuclear Sterling event in 1966, and the non-nuclear Miracle Play Program (detonable gas explosions) in 1969 and 1970. At the Hockley salt dome no documentation is available to suggest that any work was conducted after the 1964 studies.

Sand (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
8. Land Ownership	P	<p>The surface of Tatum Salt Dome was leased from Tatum Lumber Company and the Bass Pecan Company for 10 years with annual renewal options at the end of the lease term. Mineral rights were obtained through negotiation or condemnation proceedings with landowners. The Federal Court at Jackson, Mississippi issued the Order of Possession on December 21, 1962. The location of the Sand drill holes on the Tatum Dome is within the Salmon Test Site Area. As of October 1, 2006 the Department of Energy Office of Legacy Management has been responsible for a Long-Term Surveillance and Maintenance Plan for the site.</p> <p>Ownership of the surface and subsurface rights at the Hockley salt dome are unknown, but the salt mine that was considered for the Sand experiment was owned by the United Salt Corporation.</p>
9. Agencies/Companies	C	<p>U.S. Department of Defense Advance Research Projects Agency, the Division of Military Applications, and the Air Force Tactical Air Command; U.S. Atomic Energy Commission, Albuquerque and Nevada Operations Offices; U. S. Weather Bureau; U.S. Bureau of Mines; U.S. Geological Survey in Denver and the Crustal Studies Branch; Lawrence Radiation Laboratory; Holmes & Narver, Incorporated; Sandia Corporation; U.S. Army Corps of Engineers, Waterways Experiment Station; U.S. Coast and Geodetic Survey; Fenix & Scisson, Incorporated; Petroleum Consultants, Houston, Texas; Stanford Research Institute; Edgerton, Germeshausen, and Grier, Incorporated; U.S. Public Health Service; Hazelton – Nuclear Science Corporation; Roland F. Beers, Incorporated; John A. Blume and Associates; Reynolds Electrical, Engineering Company, Incorporated; and United Salt Corporation.</p>

*C= complete, P= partial data, N= no data

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SERGIUS NARROWS
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Project Sergius Narrows initially involved studies for improving the navigation channel at Sergius Narrows. During the 1960s the U.S. Army Corps of Engineers, Alaska District, investigated a number of alignments for the channel and recommended widening the channel by removing sections of the Wayanda Ledge and West Francis Rock. The U.S. Army Engineer Nuclear Cratering Group investigated the feasibility of widening the channel using nuclear excavation technology. The project concept then expanded to a series of studies by the U.S. Army Explosive Excavation Research Office (formerly the Nuclear Cratering Group) and included: 1) high explosive cratering studies on Liesnoi Island, north of Sergius Point, 2) a study of emplacement techniques for explosive excavation of Sergius Narrows, and 3) underwater explosive modeling tests for the project.
2. Location	P	Sergius Narrows is within the northern Alexander Archipelago, southeastern Alaska, about 30 miles northwest of Sitka, Alaska. Wayanda Ledge and West Francis Rock are just off Sergius Point, and Liesnoi Island is approximately 1 mile northeast of Sergius Point. The charge locations for the high explosive tests on Liesnoi Island are provided on a map, but the map is not tied into a specific grid location. The location of the model scale tests to verify the design concept for Sergius Narrows is not known.
3. Beginning Date	C	The initial project concept to widen the channel at Sergius Narrows was in place by the mid-1960s. The high explosive tests on Liesnoi Island began on June 8, 1970. The emplacement studies and underwater modeling tests were underway by the early 1970s.

Sergius Narrows (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
4. Fieldwork Dates	P	No fieldwork was conducted for the initial feasibility study for using nuclear explosives at Sergius Narrows. Preparations for the high explosive test detonations at Liesnoi Island began in the spring of 1970. Drilling was conducted on Liesnoi Island in May and June 1970, and the test detonations took place between June 8 and July 8, 1970 followed immediately by post-test activities. No information is available to determine the dates for fieldwork for the emplacement studies and underwater modeling tests. A field visit was made to Sergius Narrows in February 1972.
5. Fieldwork Description	P	The study of the feasibility of using nuclear excavation techniques to widen the channel was based on information from earlier U.S. Army Corps of Engineers, Alaska District studies. Fieldwork conducted as part of the Liesnoi Island experimental program included grading staging areas, drilling 57 holes with a diameter of from 4-6 in for charge emplacement, taking core samples from the drill holes, charge emplacement, and detonation. Post-shot activities included crater measurements, pressure data analysis, and fill kill studies conducted by the Alaska Department of Fish and Game and the Bureau of Commercial Fisheries. The extent and nature of fieldwork for the emplacement studies is not known. The underwater modeling tests consisted of a series of seven single-charge calibration detonations in concrete, and ten single-charge detonations with water overburden. Each detonation was a 1 lb spherical charge of Composition C-4.
6. Activity Level	C	The Sergius Narrows project had a number of components. In Sergius Narrows the project was a Level 5 activity, and on Liesnoi Island the project was a Level 2 activity. Model tests were a Level 2 activity although the location of the tests is not known.

Sergius Narrows (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
7. Ending Date	P	The feasibility study for nuclear excavation of the channel was issued in November 1968. The high explosive experimental detonations on Liesnoi Island were concluded in July 1970, with the final report issued in November 1971. The final reports for the emplacement design techniques and underwater explosive modeling tests were issued in August 1971 and January 1972, respectively. A final report for information about blasting operations and dredging operations was to be issued in June 1972, but it appears this report was not completed.
8. Land Ownership	C	Sergius Narrows and Liesnoi Island are within the Tongass National Forest, administered by the U.S. Forest Service.
9. Agencies/Companies	C	Project participants included the U.S. Army Explosive Excavation Research Office (formerly known as U.S. Army Engineer Nuclear Cratering Group); U.S. Army Engineer Waterways Experiment Station; U.S. Army Corps of Engineers, Alaska District; Lawrence Radiation Laboratory; U.S. Geological Survey; Gulf General Atomic; and Alaska Department of Fish and Game.

*C= complete, P= partial data, N= no data

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SHEMYA ISLAND
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	The project involved the use of a nuclear explosive to create a useable harbor in the Semichi Islands (Aleutian Island chain) for the benefit of the U.S. Government and others. Using one 20 kt nuclear explosive, placed at a depth of 400 ft, it was projected that the crater for the harbor would be 880 ft in diameter and 190 ft deep.
2. Location	C	The Semichi Islands (Shemya, Nizki, and Alaid) are near the west end of the Aleutian Island chain of Alaska. Shemya Island is approximately 3.8 miles long by 1.8 miles wide. Skoot Cove, the preferred location for the nuclear harbor excavation, is 0.7 miles from the west end of the island.
3. Beginning Date	C	The earliest documentation for the harbor project is October 10, 1960, the date of the preliminary feasibility study.
4. Fieldwork Dates	C	No fieldwork was conducted.
5. Fieldwork Description	C	Not Applicable
6. Activity Level	C	Shemya Island was a Level 5 activity. Activity was confined to conceptual design and background research.
7. Ending Date	C	No documentation is available to suggest that the project continued beyond the preliminary study.
8. Land Ownership	C	In 1960, Shemya Island was under the jurisdiction of the U.S. Air Force with Shemya Air Force Base occupying the area. This base was later known as Shemya Air Station and currently Eareckson Air Force Station. Today the island continues to be under the primary control of the U.S. Air Force with U.S. Department of the Interior having secondary jurisdiction because the island is part of the Alaska Maritime National Wildlife Refuge and the National Wildlife Refuge System.

Shemya Island (continued)

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
9. Agencies/Companies	C	Lawrence Radiation Laboratory

*C= complete, P= partial data, N= no data

SLOOP
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	The purpose of Project Sloop was to evaluate if copper could be commercially produced by using nuclear explosives to break low-grade oxidized copper ore bodies to prepare them for in situ leaching and subsequent recovery of copper. Specifically, the project objectives were to: 1) determine what percentage of copper could be recovered from a nuclear chimney using in-situ leaching techniques; 2) study the behavior of radionuclides during the in-situ leaching process to determine what measures, if any, would be needed for radiation control and decontamination of the copper; and 3) test the capability of predicting the physical effects of a nuclear explosion in a new medium. The plan called for detonating a nuclear explosive with a yield of about 20 kts at a depth of 1,200 ft below the surface. The explosion was to create a rubble chimney about 440 ft high and 200 ft in diameter containing about 1.3 million tons of fragmented rock with more than 8 million pounds of copper. The study of feasibility was to include a leaching-investigation phase that would include operation of a leach plant for one year.
2. Location	C	The study focused on a copper ore body in the Lone Star Mining District, Graham County, Arizona, about 9 miles northeast of Safford, Arizona, and 30 miles west of the New Mexico border. The ore body is in the Gila Mountains at an elevation of 4,500 to 5,500 ft. The area in the immediate vicinity of a Kennecott Copper Corporation exploratory drill hole, hole G-13, N1/2, Sec. 8, T6S R27E, was proposed for the nuclear experiment.
3. Beginning Date	C	As early as 1957 the Kennecott Copper Corporation had investigated the idea of using nuclear explosives to mine the low-grade Safford deposit. In 1962, as part of the Plowshare program, the U.S. Bureau of Mines contacted major mining companies in the west concerning a possible Plowshare application for mineral recovery. By June 1963, contacts and discussions began between the Kennecott Copper Corporation, the

Sloop (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
3. Beginning Date (cont.)		U.S. Bureau of Mines, the U.S. Atomic Energy Commission, and the Lawrence Radiation Laboratory concerning a nuclear in-situ leach project at the Safford property. Representatives of the various agencies met at the San Francisco Operations Office in October to conduct a preliminary evaluation of the Safford site. On February 26, 1965, the U.S. Atomic Energy Commission distributed a report on the status of discussions and activities for the copper recovery experiment, named Project Sloop.
4. Fieldwork Dates	C	No fieldwork was conducted after drilling the initial exploratory hole, G-13, in 1961.
5. Fieldwork Description	C	Prior to undertaking the feasibility study, Kennecott Copper had drilled an exploratory drill hole, G-13, for site characterization. Data from this exploratory hole were used to develop the project design. For Project Sloop, Kennecott proposed a pre-shot investigation that would consist of four pre-shot holes, drilled near the proposed emplacement hole, each 200 ft below the shot depth. Cores, photography and pressure tests would be conducted to study the geology in detail. For the emplacement of the explosive, a hole would be drilled to a depth of 1,200 ft. This hole would be placed near the Kennecott exploration hole G-13. The hole would be 20 inches in diameter and would not be reentered after the detonation. The hole would be stemmed with grout plugs and pea gravel. A nearby shaft also would be stemmed with 50 ft of sand, charcoal, and asphalt. All drill holes located up to 1,000 ft from the emplacement hole would be stemmed. Physical effects measurements would be taken in the emplacement hole and a nearby hole. Seismic information would be recorded at various locations nearby and at different distances from the ground zero. After the detonation, Hole S-7 would be drilled near the emplacement hole and would be used for characterizing the chimney. Two other post-shot holes, S-8 and S-9, would be drilled to 1,400 ft just outside the chimney perimeter and two whipstock holes would be drilled from these two holes to cross the chimney edge and cavity bottom. The proposed field activity was not executed and activity was confined to site visits.

Sloop (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
6. Activity Level	C	Project Sloop was a Level 4 activity. An exploratory hole was drilled in 1961 and data were used for evaluation of the project feasibility and design of the proposed experiment.
7. Ending Date	C	At a meeting held on March 6, 1970, the Nevada Operations Office discussed the need for a detailed scope of work for investigation of the subsurface hydrologic characteristics of the proposed Sloop site, and recommended that an exploratory drilling program be initiated as soon as possible. However, Kennecott company management had not responded to the request for modifying the drilling plan. In a May 8, 1970 memo discussing scheduling of Plowshare tests, there is mention that the company had denied funds for additional exploratory drill holes. Based on cost estimates, it appeared that use of nuclear explosions for mining were comparable to conventional methods. By the end of 1970, the project was abandoned.
8. Land Ownership	P	The mine is owned by the Kennecott Copper Corporation and the ore body is 3,500 ft by 7,500 ft. A document dating to February 3, 1964, mentions that the mine is on government-owned land leased for grazing by the Curtis Ranch. It is not known if Kennecott owned the mineral rights, some portion of the surface property, or both. The current land status is also not known.
9. Agencies/Companies	C	Project participants included: Kennecott Copper Corporation; U.S. Atomic Energy Commission, Nevada Operations Office, San Francisco Operations Office; U.S. Bureau of Mines; Lawrence Radiation Laboratory; Los Alamos Scientific Laboratory, Oak Ridge National Laboratory; U.S. Weather Bureau; John S. Blume & Associates; Roland F. Beers, Incorporated; U.S. Public Health Service; Holmes & Narver, Inc.; Reynolds Electrical & Engineering Company; U.S. Geological Survey; and the U.S. Coast and Geodetic Survey.

*C= complete, P= partial data, N= no data

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SOUTH POINT HARBOR
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	The project was the proposed nuclear excavation of a harbor for commercial and/or military vessels off South Point, Island of Hawaii, Hawaii. The concept was initially proposed by Frank Midkiff, the President of the Board of Directors for the Bernice Bishop Estate. During the spring of 1968, Midkiff presented his ideas about a harbor to the U.S. Atomic Energy Commission; the U.S. Army Corps of Engineers, Honolulu District; and the Department of Defense. In 1971, a feasibility study for a military harbor at South Point was issued by the U.S. Army Engineer Nuclear Cratering Group. In the study Plowshare nuclear explosives and the family of Atomic Demolition Explosives (ADM) were investigated for constructing the harbor. Expediency versus economic feasibility was the primary goal of the project.
2. Location	C	The location for the proposed nuclear harbor project was at South Point (also referred to as Ka Lae), Island of Hawaii, Hawaii. Apparently several locations along the shores of the lava flows in the District of Kau near South Point were being considered. One was near the shoreline in Pakini. Nothing else is known about other District of Kau/South Point locations.
3. Beginning Date	C	Status reports dating from the last quarter of 1963 through March 1965 from the Nuclear Cratering Group refer to a nuclear harbor site selection study by the U.S. Corps of Engineers, Honolulu District. South Point or Ka Lae was one of the areas being considered.
4. Fieldwork Dates	C	There is no documentation to suggest that fieldwork was associated with the site evaluation/selection study conducted by the U.S. Army Corps of Engineers, Honolulu District or for the feasibility study by the Nuclear Cratering Group.
5. Fieldwork Description	C	Not Applicable

South Point Harbor (continued)

6. Activity Level	C	South Point Harbor was a Level 5 activity. Research of the South Point area for a harbor project was confined to conceptual design of the project and background research. The project was not executed.
7. Ending Date	C	No documentation is available regarding the concept for South Point Harbor after completion of the feasibility study for a military harbor in 1971.
8. Land Ownership	P	At least one of the sites under consideration for a nuclear harbor project (the location near the shoreline at Pakini) was privately held by the Kamehameha Schools, Bernice P. Bishop Estate, Honolulu, Hawaii. The ownership of other locations is unknown at this time.
9. Agencies/Companies	C	The U.S. Atomic Energy Commission; U.S. Army Corps of Engineers, Honolulu District; U.S. Department of Defense; U.S. Army Engineer Nuclear Cratering Group; and Board of the Bernice Bishop Estate, Honolulu, Hawaii.

*C= complete, P= partial data, N= no data

SPIRIDON LAKE
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Spiridon Lake was a proposed project to use nuclear explosives to redesign the drainage of Spiridon Lake, the third largest lake on Kodiak Island in Alaska. Spiridon Lake's outlet stream crossed steep bluffs that created waterfalls impassable to salmon. The concept was to use nuclear explosives to create a landslide dam at the location of the lake outlet. The dam would cause a rise in lake level and divert the outlet flow to a well established drainage system at the north end of the lake with a more moderate elevation grade, allowing salmon to more easily reach the lake to spawn.
2. Location	C	The nuclear experiment was proposed for the canyon at the southeastern end of Spiridon Lake, at the northern end of Kodiak Island in Alaska.
3. Beginning Date	C	The date of the initial letter discussing the proposed project was May 1963.
4. Fieldwork Dates	C	No fieldwork was conducted for the project.
5. Fieldwork Description	C	Not Applicable
6. Activity Level	C	Spiridon Lake was a Level 5 activity. Activity for this project was confined to conceptual design based on existing data sources.
7. Ending Date	C	The final document that mentions the nuclear dam construction project is July 1964.
8. Land Ownership	C	The proposed project area is under government jurisdiction and falls within the Kodiak National Wildlife Refuge which is administered by the U.S. Department of the Interior, U.S. Fish and Wildlife Service.

Spiridon Lake (continued)

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
9. Agencies/Companies	C	Karl Brunstad, Alaskan resident; State of Alaska; State of Alaska Office of the Governor; Alaska Department of Fish and Game; U.S. Fish and Wildlife; Lawrence Radiation Laboratory; and U.S. Atomic Energy Commission, Division of Peaceful Nuclear Explosives.

*C= complete, P= partial data, N= no data

SURREY
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Surrey was one of the Plowshare isotope production projects under the Scientific and Engineering Applications projects. It was a Plowshare cavity experiment in a Gulf Coast salt dome, tentatively scheduled for the second quarter of FY 1964 and then rescheduled for FY 1965. The U.S. Atomic Energy Commission and the Texas Gulf Sulfur Company had meetings regarding the location for this project at one of their sites but other Gulf Coast locations were also under consideration. The project was not conducted.
2. Location	C	Several salt dome locations on the Gulf Coast in Texas and Louisiana were potential project sites including one owned by the Texas Gulf Sulfur Company in Texas. There was no specific site data.
3. Beginning Date	P	The Surrey project was in development in 1962.
4. Fieldwork Dates	C	No fieldwork was conducted.
5. Fieldwork Description	C	No fieldwork was conducted.
6. Activity Level	C	The Surrey project was a Level 5 activity as the effort was confined to conceptual design, background research, and meetings.
7. Ending Date	C	After 1963, there is no mention of this project.
8. Land Ownership	C	There were no specific locations identified.
9. Agencies/Companies	C	The U.S. Atomic Energy Commission, Nevada Operations Office and San Francisco Office; Lawrence Radiation Laboratory; and Texas Gulf Sulfur Company.

*C= complete, P= partial data, N= no data

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SWAN LAKE DAM
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	The project concept was to use nuclear explosives to build a rock-fill dam. The concept was based on a 1958 study that investigated the use of nuclear explosives to build earth-fill and rock-fill dams, but only the latter was considered technically feasible. Swan Lake in Alaska was used as a case study to discuss the application. The U.S. Geological Survey had previously recommended the construction of a dam using conventional methods at this location.
2. Location	C	The proposed dam was to be located across Cascade Creek at Swan Lake. Swan Lake is in southeastern Alaska, approximately 18 miles northeast of Petersburg, Alaska. The lake system drains into Thomas Bay on Frederick Sound.
3. Beginning Date	C	The project concept was first proposed in July 1958 in a report prepared by a scientist from the Lawrence Radiation Laboratory.
4. Fieldwork Dates	C	The location was considered by the U.S. Geological Survey for construction of a dam using conventional techniques prior to July 1958 and it is possible that some preliminary field work was conducted for the site selection process; however, no field work was conducted for the nuclear rock-fill dam concept.
5. Fieldwork Description	C	Not Applicable
6. Activity Level	C	Swan Lake Dam was a Level 5 activity. Documentation for this project is from a preliminary report that used background research from available sources.
7. Ending Date	C	There is no documentation to suggest that the concept for using nuclear excavation techniques to construct a dam at Swan Lake was investigated after the 1958 report.
8. Land Ownership	C	Swan Lake is located within the Tongass National Forest on lands owned by the U.S. Forest Service.

Swan Lake Dam (continued)

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
9. Agencies/Companies	C	Participants included the U.S. Atomic Energy Commission, Lawrence Radiation Laboratory, and U.S. Geological Survey.

*C= complete, P= partial data, N= no data

TAR
Vela Uniform Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Tar was one of three nuclear detonations (Salmon, Sand, and Tar) planned under the Dribble Program. The purpose of Dribble was to increase the U.S. capability to detect, identify, and locate underground nuclear detonations with seismic instrumentation. Salmon (5 kiloton) and Tar (100 ton) were designed to be coupled tests, and Sand (100 ton) was planned as a decoupled emplacement. Tar was planned as a coupled detonation in a tamped drill hole, approximately 2,000 feet deep in a salt environment.
2. Location	C	Tar was originally planned for the Dribble Project area at Tatum Salt Dome in Lamar County, Mississippi, 33 miles southwest of Hattiesburg (at Station 2). However, when water seepage problems were encountered at Tatum Dome during drilling for the Sand emplacement, planning for Tar and Sand shifted to a Texas location, the Hockley Mine. The Hockley Mine was in the Hockley Salt Dome five miles south of Hockley in Harris County, approximately 35 miles northwest of Houston. After drilling problems at Tatum Salt Dome were resolved, discussions allude to conducting Tar and Sand there instead of the Hockley Mine.
3. Beginning Date	C	The 1962 revised Dribble Program scope proposed a 100 ton tamped (coupled) experiment, named Tar in 1963.
4 Fieldwork Dates	C	There is no documentation to suggest that any drilling activities took place at Tatum Salt Dome, Station 2, for the Tar emplacement. An aerial photo from a 1963 document shows that ground clearing activities had occurred. After engineering problems were encountered during drilling for the Sand emplacement at Station 3, the Tar event at Tatum Salt Dome was cancelled. On-site field inspection of the Hockley Salt Dome as an alternative location for the Sand event took place during 1964.

Tar (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
5. Fieldwork Description	C	In 1963, two high explosives tests were conducted at Tatum Salt Dome near the Sand and Tar emplacement locations in order to calibrate the seismic signals before both tests. At the Hockley salt dome location, the U.S. Atomic Energy Commission, Nevada Operations Office conducted preliminary fieldwork during 1964 for the conceptual engineering and construction plan for the Sand and Tar detonations. No detailed on-site reconnaissance was undertaken at Hockley Salt Dome, fieldwork was confined to inspection of the mine and facilities.
6. Activity Level	C	Tar was a Level 4 activity at the Hockley Dome where a pre-existing mine was used to study the salt deposit. The Tatum Salt Dome is a Department of Energy monitored site.
7. Ending Date	C	Of the available documents, those with a date of 1965 or later do not mention Sand and Tar. There is no information to indicate that these experiments were ever conducted or when the decision was made to cancel the tests. After 1964 there is no indication that the Hockley Dome was considered for the experiments. Other nuclear tests were conducted at the Tatum Salt Dome: the Salmon event in 1964, the Sterling Project in 1966, and the non-nuclear Miracle Play Program (detonable gas explosions) in 1969 and 1970.
8. Land Ownership	C	The surface of Tatum Salt Dome was leased from Tatum Lumber Company and the Bass Pecan Company for 10 years with annual renewal options at the end of the lease term. Mineral rights were obtained through negotiation or condemnation proceedings with landowners. The Federal Court at Jackson, Mississippi issued the Order of Possession on December 21, 1962. The United Salt Company owned the mine in the north central portion of the Hockley Salt Dome. The location of Tar on the Tatum Dome is within the Salmon Test Site Area. As of October 1, 2006 the Department of Energy Office of Legacy Management has been responsible for a Long-Term Surveillance and Maintenance Plan for the site.

Tar (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
8. Land Ownership (cont.)		Ownership of the surface and subsurface rights at the Hockley salt dome are unknown, but the salt mine that was considered for the Tar experiment was owned by the United Salt Corporation.
9. Agencies/Companies	C	The agencies/companies found in the documentation included the U.S. Department of Defense Advanced Research Projects Agency, the Division of Military Applications, and the Air Force Tactical Air Command; U.S. Atomic Energy Commission Albuquerque and Nevada Operations Offices, U. S. Weather Bureau, Nevada Test Site, U.S. Bureau of Mines, U.S. Geological Survey in Denver and the Crustal Studies Branch; Lawrence Radiation Laboratory; Holmes & Narver, Incorporated, Sandia Corporation; U.S. Army Corps of Engineers, Waterways Experiment Station; U.S. Coast and Geodetic Survey; Fenix & Scisson, Incorporated; Stanford Research Institute; Edgerton, Germeshausen, and Grier, Incorporated; U.S. Public Health Service; Hazelton – Nuclear Science Corporation; Roland F. Beers, Incorporated; John A. Blume and Associates; Reynolds Electrical and Engineering Company, Incorporated, and United Salt Company.

*C= complete, P= partial data, N= no data

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TENNESSEE-TOMBIGBEE WATERWAY
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	The Tennessee-Tombigbee Waterway was a proposed inland navigation canal to connect the Tennessee River in northeastern Mississippi with the Tombigbee River in west-central Alabama. Completion of the canal would provide a continuous waterway from the Tennessee and Ohio Valleys to the Gulf of Mexico at Mobile, Alabama. The nuclear component of the project was to use nuclear explosives to excavate the divide cut between the Tennessee and Tombigbee River. The proposal called for using 81 nuclear devices ranging in yield from 10 to 50 kt, with a total yield of 1.9 megatons, to excavate a 200 to 300 ft wide canal for a distance of 5.3 miles through a ridge referred to as the Bear Creek Divide.
2. Location	C	Nuclear excavation was proposed for the Bear Creek Divide, a ridge that separated the Tennessee River drainage system from the Tombigbee River. The Bear Creek Divide is located near the town of Tishomingo, Mississippi in northeastern Mississippi.
3. Beginning Date	C	The canal project was authorized by Congress in 1946 in the Rivers and Harbor Act. A nuclear excavation component for the project was introduced in early 1963.
4. Fieldwork Dates	C	No fieldwork was conducted for the nuclear excavation.
5. Fieldwork Description	C	Not Applicable
6. Activity Level	C	Tennessee-Tombigbee Waterway was a Level 5 activity. Activity for the project was limited to conceptual design, background research, and visual field inspections.
7. Ending Date	C	In a letter dated May 4, 1967, the Director of the U.S. Army Engineers Nuclear Cratering Group informed Lawrence Radiation Laboratory that the project was no longer under consideration for a Plowshare application.
8. Land Ownership	P	The area is a patchwork of private lands.

Tennessee-Tombigbee Waterway (continued)

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
9. Agencies/Companies	C	Participants included the U.S. Atomic Energy Commission, Division of Peaceful Nuclear Explosions; U.S. Army Engineer Nuclear Cratering Group; U.S. Army Corps of Engineers, Mobile District; U.S. Atomic Energy Commission, Nevada Operations Office; the Sandia Corporation; and the Mississippi Industrial and Technological Research Commission

*C= complete, P= partial data, N= no data

THUNDERBIRD
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	<p>Project Thunderbird was a coal-energy development program. A group of coal engineers (primarily the firm of Wold & Jenkins) contacted the U.S. Atomic Energy Commission, U.S. Bureau of Mines and the U.S. Geological Survey regarding the prospect of conducting a nuclear experiment for in situ coal gasification in northeastern Wyoming. The project centered on the detonation of a nuclear explosive in subsurface coal deposits to create a rubble chimney and surrounding fracture zone that would allow for the production and capture of low Btu gas through the subterranean burning of the coal. The project never progressed beyond the data gathering and geologic characterization stage.</p>
2. Location	C	<p>The Thunderbird project area was located in the central Powder River Basin of northeastern Wyoming. It consisted of a 100 sq mi area about 20 miles west of the city of Gillette, on Interstate Highway 90 in Campbell and Johnson Counties. The location covered parts of Township 51 North, Ranges 76 and 77 West; Township 50 North, Ranges 75, 76, and 77 West; Township 49 North, Ranges 75 and 76 West; and Township 48 North, Ranges 75 and 76 West. The specific locations of the 14 coal bed characterization holes drilled for the project are provided below. The numeric designations 1 through 14 were randomly assigned during the current research project. Original names or numeric designations of the drill hole are unknown.</p> <ol style="list-style-type: none"> 1. located just northwest of the junction of Bridge Draw and Dead Horse Creek in the NW1/4NE1/4, Sec. 7, T48N R75W, Campbell County, WY. 2. located about 1.25 mi southwest of the junction of Pearson Draw and Dead Horse Creek in the center of the N1/2NE1/4, Sec. 2, T48N R76W, Campbell County, WY. 3. located between Morgan Draw and Government Draw in the W1/2NW1/4, Sec. 3, T48N R76W, Campbell County, WY.

Thunderbird (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
2. Location (cont)		<p>4. located about 0.5 mi southwest of Dead Horse Creek and 0.75 mi east of Morgan Draw in the NE1/4NE1/4NE1/4, Sec. 35, T49N R76W, Campbell County, WY.</p> <p>5. located just north of Dead Horse Creek on the south side of Interstate Highway 90 in the N1/2SE1/4, Sec. 22, T49N R76W, Campbell County, WY</p> <p>6. situated about 1.5 mi east of the South Prong channel of Barber Creek in the SW1/4SW1/4SW1/4, Sec. ?, T49N R75W, Campbell County, WY.</p> <p>7. located about 1 mi east of the South Prong channel of Barber Creek in the SW1/4NW1/4, Sec. 8, T49N R75W, Campbell County, WY.</p> <p>8. located along a wash between Barber Creek and the South Prong drainage channel in the NE1/4NE1/4, Sec. 6, T49N R75W, Campbell County, WY.</p> <p>9. located at the head of the wash between Barber Creek and the South Prong drainage channel in the SE1/4NE1/4, Sec. 31, T50N R75W, Campbell County, WY.</p> <p>10. located in the Maycock Draw north of Barber Creek and west of the Kinney Divide in the SE1/4SW1/4, Sec. 10, T50N R76W, Campbell County, WY.</p> <p>11. located 0.75 mi north of Barber Creek and west of Maycock Draw in the W1/2SW1/4, Sec. 9 T50N R76W, Campbell County, WY.</p> <p>12. located at the north end of Maycock Draw in the NE1/4NW1/4, Sec. 3, T50N R76W, Campbell County, WY.</p> <p>13. located about 3 miles north of the junction of Interstate Highway 90 and Laskie Draw in the NE1/4SE1/4, Sec. 32, T50N R76W, Johnson County, WY.</p> <p>14. located on Barber Creek in either the SW1/4SW1/4SW1/4, Sec. 7, or the NW1/4NW1/4NW1/4, Sec. 18, T50N R76W, Johnson County, WY.</p>
3. Beginning Date	C	The concept for Project Thunderbird originated in 1966 or early 1967.
4. Fieldwork Dates	C	The potential project location was identified in 1966 or early 1967. Visits to some of the 151 existing oil wells within the project area took place between 1966 and early 1969. Drilling of the 14 new coal bed characterization holes took place between April and June 1969.

Thunderbird (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
5. Fieldwork Description	C	The fieldwork consisted of visits to existing oil wells in the Thunderbird project area. Additionally, 14 new coal bed characterization holes were drill during the second quarter of CY 1969. Geological, geophysical and hydrological characterizations of the coal deposits were made using the cores.
6. Activity Level	C	Project Thunderbird was a Level 3 activity with field work limited to use of existing wells and the drilling of 14 new characterization wells. The location was visited in FY 2006.
7. Ending Date	C	Field characterization studies ended in June 1969. A negative critique questioning the technical and economic feasibility of the nuclear component of the project by an independent engineering firm was submitted in July 1969. The subsequent concurrence of the negative conclusions by personnel from Lawrence Radiation Laboratory in August 1969 effectively ended the project.
8. Land Ownership	C	A review of the land status records on at the Bureau of Land Management Wyoming State Office in Cheyenne revealed that all 14 of the coal bed characterization drill hole locations were on leases held by the firm of Wold and Jenkins at the time of the project in the late 1960s. All the leases were allowed to lapse in the 1970s reverting to the Bureau of Land Management. New leases have been issued to other oil and gas development companies for some of the locations while other locations remain unleased. The records review indicated that none of the locations for Project Thunderbird were ever administered by the U.S. Atomic Energy Commission either through a withdrawal, transfer, or special use permit.
9. Agencies/Companies	C	Project participants included the U.S. Atomic Energy Commission; U.S. Bureau of Mines; U.S. Geological Survey; Lawrence Radiation Laboratory; CER Geonuclear Corporation; Wold & Jenkins; University of Wyoming, Natural Resources Institute; Materi Exploration; Gibbs and Hill, Inc.; and a few independent consulting geologists/engineers.

*C= complete, P= partial data, N= no data

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TRAVOIS
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	<p>Project Travois was a proposed quarrying experiment conceived of as a demonstration project for nuclear dam construction methods. The objectives for Project Travois were to assess the technical and economic feasibility of using a nuclear explosion to fracture rock into rubble suitable for building a rock-fill dam across a narrow river canyon.</p>
2. Location	C	<p>Three locations were eventually considered for Project Travois. These included the Buchanan Dam in California, the Twin Springs Dam in Idaho, and the Catherine Creek Dam in Oregon.</p> <p>The Buchanan Damsite was located on the Chowchilla River, Merced County, CA approximately 17 miles northeast of Chowchilla, 26 miles east of Merced, and 35 miles northwest of Fresno. A potential nuclear quarry site was 2.25 miles due north of the damsite in Mariposa County. The damsite was in the W1/2SE1/4, Sec. 22, T8S R18E. The nuclear quarry ground zero was in the N1/2SE1/4 Sec. 10, T8S R18E.</p> <p>The Twin Springs site was on the Boise River, 28 miles east of Boise and about 14 miles upstream from Arrowrock Dam in the Sawtooth Mountains area of the Boise National Forest. The damsite was in the SW1/4, Sec. 12, T4N R7E, Boise Principal Meridian, approximately 2 miles below the junction of the North and Middle Forks of the Boise River in Idaho. The dam spanned the boundary between Boise and Elmore counties. The quarry location was about 1 mile to the northwest of the damsite in the SW1/2NE1/4, Sec. 12, T4N R6E, Boise County.</p> <p>The Catherine Creek Damsite was located on a tributary of the Grande Ronde River in Union County in northeastern Oregon. The proposed nuclear quarry was 25 miles northeast of Baker City and 8 miles southeast (upstream) of the town of Union near the Oregon, Idaho, and Washington border.</p>

Travois (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
3. Beginning Date	C	The initial concept for Project Travois originated in 1965/1966 with site selection process beginning in 1966.
4. Fieldwork Dates	C	Site selection began in 1966. With field assessments conducted at the different locations between mid -1966 and mid-1969. The nuclear quarry experiment stalled out in 1969.
5. Fieldwork Description	C	At least one geological test hole was drilled at the Twin Springs Idaho location. Geological, geophysical and hydrological characterizations of the geological formations at all three locations – Buchanan, Twin Springs, and Catherine Creek were made using the cores, measurements, and data from pre-existing drill holes and wells. Several dirt access roads were graded.
6. Activity Level	C	Project Travois was a Level 3 activity which corresponds to fieldwork limited to using existing characterization holes, drilling at least one core hole, and grading several access roads. The Twin Springs Idaho project site was visited in FY2004.
7. Ending Date	C	No activity for the project could be documented after 1969 although some presentations on the project were given in early 1970.
8. Land Ownership	C	During FY 2004, a review of the land status records on file at the Idaho State Office of the Bureau of Land Management in Boise revealed that the Project Travois project area fell within lands administered by the U.S. Forest Service as part of the Boise National Forest. That agency continues to administer the land today.
9. Agencies/Companies	C	Participants included the U.S. Atomic Energy Commission, San Francisco Operations Office, and Nevada Operations Office; U.S. Army Corps of Engineers, Nuclear Cratering Group; Lawrence Radiation Laboratory; U.S. Army Corps of Engineers, Sacramento District and Walla Walla District; Idaho Water Resources Board; U.S. Geological Survey; U.S. Bureau of Reclamation; Edgerton, Germeshausen, and Grier Inc.; Environmental Science Service Administration; and Sandia Corporation.

*C= complete, P= partial data, N= no data

TRENCHER
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Trencher was an explosive evaluation experiment conducted in clay shale with four objectives: 1) to determine the single-charge cratering performance in clay shale of two different aluminized slurry explosives; 2) to determine the effects of different stemming materials on craters formation; 3) to determine the effects of different cylindrical charge geometries on crater formation; and 4) to determine the feasibility of springing holes in clay shale. Project Trencher was an extension of earlier small-scale (8-lb to 12-lb) chemical explosive tests conducted at Lawrence Radiation Laboratory's Explosive Test Facility, Site 300. The Trencher field testing program focused on obtaining data on explosive excavation methodology using substantially larger (500-lb vs. 8-lb) chemical charges. The Trencher series of detonations would provide comparative data for even larger chemical excavation experiments and the eventual application of nuclear explosives in large civil works projects.
2. Location	C	Fort Peck Reservoir, Montana. Project area located on Duck Creek Inlet approximately 1 mile west of the Pre-Gondola project site.
3. Beginning Date	C	The concept was proposed in early 1969.
4. Fieldwork Dates	C	Exact dates of experimental detonations are unknown, but they all occurred sometime during August 1969. Post-shot investigations which involved crater analyses including volume, depth, lip radius, and fallback and ejecta characterization continued through the end of 1969.

Trencher (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
5. Fieldwork Description	C	Project Trencher consisted of 47 detonations conducted in four phases designated Phases A through D. Phase A consisted of 17 test detonations of 500-lb charges in 55-gal drums. Phase B consisted of 5 test detonations of 500-lb charges in 55-gal drums using a variety of stemming materials. Phase C was comprised of 20 test detonations of 500-lb charges placed in cylindrical containers of different lengths and diameters. Phases A, B, and C utilized 30-inch diameter boreholes of varying depths for the emplacement of the charges. Phase D, the hole springing test series, consisted of 5 test detonations utilizing 5- to 10-lb charges placed 10 to 20 ft deep in 1-ft diameter boreholes. Post shot activities involved crater analyses including volume, depth, lip radius, fallback and ejecta characterization, and more. Site clean up included removal of support buildings, instrumentation, and backfilling some of the craters.
6. Activity Level	C	Project Trencher was a Level 2 activity with fieldwork consisting of the drilling of numerous emplacement holes and chemical explosive detonations.
7. Ending Date	C	The high explosive tests were completed in August 1969. The final project report was issued in November 1970. Final clean up of the equipment, instrumentation, and temporary structures and backfilling of most of the craters took place in the summer of 1972.
8. Land Ownership	C	U.S. Army Corps of Engineers is the agency responsible for lake and the land up to the “take line” along the shore of the reservoir. The Charles M. Russell National Wildlife Refuge, U.S. Fish and Wildlife Service was and is responsible for the surrounding land.
9. Agencies/Companies	C	The U.S. Army Engineers Nuclear Cratering Group; U.S. Army Corps of Engineers, Omaha District; Lawrence Radiation Laboratory; and U.S. Atomic Energy Commission, Mile High Drilling Company, Inc.; Valley Electric Cooperative, Inc.; and Continental Engineers, Inc.

*C= complete, P= partial data, N= no data

TRINIDAD
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	<p>Project Trinidad was a U.S. Corps of Engineers Nuclear Cratering Group Plowshare experiment consisting of multiple explosive excavation experiments using high-explosive single-and row-charges to create large craters and three railroad cuts. In keeping with Corps of Engineers' policy of conducting research activities in conjunction with actual civil works projects whenever practical, the construction of an earthfill dam across the Purgatoire River near Trinidad, Colorado provided a venue for Project Trinidad. Construction of the dam and adjacent reservoir inundated the existing Colorado and Wyoming Railroad tracks making relocation a necessity. The required through-cuts for the realignment afforded the opportunity for a practical application of cratering excavation. Technical programs associated with the tests included seismic effect investigations, air blast monitoring, fallout simulation tests and engineering property studies. Supplemental cratering tests Mini Mound I and II and Middle Course I and II were incorporated into the overall Project Trinidad experimental program.</p>
2. Location	C	<p>The main experimental test area for the Trinidad project is located approximately five miles southwest of the town of Trinidad, Colorado in the S1/2, Sec. 31, T33S R64W, Animas County. Situated on the west side of Long Canyon just south of Trinidad Lake. This area is the site of the A, B, and C series of chemical explosive detonations, the D4 row charge blast that created Railroad Relocation Cut #1 (RR#1), the six craters from the Middle Course I series, detonations M1 and M2 of the Middle Course II series and the Mini Mound I 1A and 1B row charge blasts. The remaining 14 detonations of the Middle Course II series along with the Mini Mound II 2A and 2B row charge blasts were located in Frisco Canyon, about 3 miles east of Long Canyon near Starkville, CO. Railroad Relocation Cut #2 (RR#2) was located on the east side</p>

Trinidad (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
2. Location (cont.)	C	of Long Canyon in the NW1/4, Sec. 32. Detonations D1, D2, and D3 were conducted approximately 1/2 mile east of Long Canyon just south of the relocated railroad route. Railroad Relocation Cut #3 (RR#3) was located about 2 miles east of Long Canyon in the NW1/4, Sec. 33, T33S R64W.
3. Beginning Date	C	The initial concept for Project Trinidad originated in 1969 or early 1970 with a proposal from the Nuclear Cratering Group and the U.S. Army Corps of Engineers, Albuquerque District.
4. Fieldwork Dates	C	Fieldwork began in Spring 1970 and continued intermittently through September 1971.
5. Fieldwork Description	C	The fieldwork for the project included the establishment of at least four control points, several access roads, multiple camera stations, numerous instrument recording stations, and several temporary support buildings. Additionally, emplacement holes or support stands were constructed for the 40+ cratering experiments. The three railroad cuts were blasted. After the experiments were completed, the temporary structures, instrumentation, and debris was removed and the craters backfilled.
6. Activity Level	C	Project Trinidad and the associated Middle Course and Mini Mound series were a Level 2 activity where conventional explosives were used for excavating the three railroad relocation cuts and the various cratering experiments. The Trinidad project site was inspected in FY 2003.
7. Ending Date	C	The last field activity for Project Trinidad occurred in September 1971. The final reports were issued in October 1974.
8. Land Ownership	C	At the time of the Trinidad experiments, the entire explosive test site fell within the Trinidad Lake Project boundaries on lands administered by the U.S. Army Corps of Engineers, Albuquerque District. However, after the completion of the dam and filling of the reservoir, the Trinidad State Recreation Area was established. The Corps administers the dam and reservoir proper. The surrounding land, which includes the Project Trinidad test area is owned and administered by the state of Colorado.

Trinidad (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
9. Agencies/Companies	C	Participants included the U.S. Atomic Energy Commission, Nevada Operations Office; U.S. Army Engineer Waterways Experiment Station, Explosive Excavation Research Laboratory (formerly known as U.S. Army Engineers, Nuclear Cratering Group); Lawrence Livermore Laboratory, K-Division (formerly known as Lawrence Radiation Laboratory); U.S. Army Corps of Engineers, Albuquerque District; U.S. Geological Survey; Sandia Laboratories; John A. Blume & Associates; National Oceanic and Atmospheric Administration, Environmental Research Laboratories/Earth Sciences Laboratory; Mile High Drilling Company; IRECO Chemicals; Limbaugh Engineers; and Dunegan Research Corporation.

*C= complete, P= partial data, N= no data

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TUGBOAT
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Project Tugboat was a high explosive excavation experiment of a small boat harbor in Kawaihae Bay, Hawaii. Tugboat was designed as a “demonstration” project. Its primary purpose was the development of explosive excavation techniques that were economically competitive with conventional methods and could serve as models for future nuclear excavation projects. It was a joint U.S. Army Corps of Engineers, Nuclear Cratering Group, and U.S. Atomic Energy Commission project.
2. Location	C	The project area is located on the northwest coast of the Island of Hawaii in Kawaihae Bay. It lies adjacent to an existing coral-fill causeway that borders the Kawaihae Deep-Draft Boat Harbor.
3. Beginning Date	C	The Kawaihae Bay location was initially proposed by the U.S. Army Corps of Engineer’s Honolulu District in March 1968. The formal Project Tugboat concept was jointly developed by the Army Engineer Nuclear Cratering Group and Lawrence Livermore Laboratory in June 1969.
4. Fieldwork Dates	C	Initial on-site investigations, including drilling fifteen sampling holes in the coral formation, occurred during the summer of 1969. The experimental detonation program took place between November 1969 and December 1970. Post-shot technical investigations concluded in early 1971.
5. Fieldwork Description	C	On-site investigations included drilling fifteen sampling holes in the coral formation, and construction of a causeway and some temporary support structures. Phase I fieldwork consisted of a series of five calibration charges ranging in size from 1 ton to 10 tons. Phase II was the actual harbor construction and used eight charges to produce the entrance channel and four to create the berthing basin. All of the charges contained aluminized ammonium nitrate slurry and ranged from 10 to 20 tons. Sixteen small

Utah (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
5. Fieldwork Description (cont.)		remedial detonations were used to reshape the entrance channel. The breakwater was built prior to the remedial blasts. Pre- and post-shot investigations included various environmental (biological and archaeological) studies as well as technical investigations of the coral medium and crater morphology.
6. Activity Level	C	Project Tugboat was a Level 2 activity where conventional explosives were used for excavating a harbor. The Tugboat harbor was inspected in FY 2003.
7. Ending Date	C	The explosive excavation of the harbor was completed in December 1970. The final project reports were issued in early 1972.
8. Land Ownership	C	The U.S. Coast Guard currently operates the Kawaihae small boat harbor including the berthing basin created by Project Tugboat. The entire harbor facility is administered as part of Hawaii's state-wide system of small boat harbors which provide support for light-draft commercial vessels, fishing boats, and recreational craft.
9. Agencies/Companies	C	Project participants included the U.S. Atomic Energy Commission; U.S. Army Engineer Waterways Experiment Station, Explosive Excavation Research Laboratory (formerly known as U.S. Army Engineers, Nuclear Cratering Group); Lawrence Livermore Laboratory, K-Division (formerly known as Lawrence Radiation Laboratory); U.S. Army Corps of Engineers, Honolulu and Los Angeles Engineer Districts; U.S. Army Corps of Engineers, Coastal Engineering Research Center; Sandia Laboratories; John A. Blume & Associates; University of Hawaii; State of Hawaii, Division of Fish and Game; ESSO Production Research (a division of Humble Oil Company); Dow Chemical Company; and Mile High Drilling Company.

*C= complete, P= partial data, N= no data

UTAH
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	The proposed Project Utah experiment originally involved the nuclear fracturing of an oil shale deposit and the in situ retorting of the broken rock. It was eventually revised to focus primarily on rock breakage and the creation of a rubble chimney with the goals of 1) obtaining data for calculations to determine the technical and economic feasibility of oil recovery from oil shale using nuclear explosives and 2) facilitating the engineering design of an in situ oil shale retort and recovery experiment.
2. Location	C	The Project Utah experiment area was located Uintah County in northeastern Utah, about 8 miles southeast of the town of Ouray and approximately 40 road miles from Vernal, Utah. Well EX-1 was drilled at 504 ft from the south line, 1,844 ft from the east line, in the SW1/4SE1/4SE1/4, Sec. 36, T9N R20E, Salt Lake Base Meridian.
3. Beginning Date	C	The initial concept for a Utah nuclear oil shale fracturing experiment originated in 1962 but was not formalized until the second half of 1968.
4. Fieldwork Dates	C	Site selection began in late 1968 or early 1969. The one and only test well for the project was drilled in July and August 1969. No additional field work is documented after the summer of 1969.
5. Fieldwork Description	C	A single test hole (EX-1) was drilled on the Western Oil Shale Corporation lease in Sec. 36, T9N R20E. Field activities and facilities associated with the project included the test well, a mud pit surrounded by a low berm, barbed wire fencing around the mud pit, as well as the drill rig and several temporary trailers. Several dirt access roads were graded. The drill rig and trailers were relocated once the drilling was concluded in August 1969.
6. Activity Level	C	Project Utah was a Level 3 activity which corresponds to fieldwork limited to drilling the EX-1 test hole and grading several access roads. Geological, geophysical and hydrological characterizations of the geological formations were made using the cores

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
6. Activity Level (cont.)		and measurements from the test hole as well as using data from the pre-existing wells in the surrounding area. The Project Utah site was visited in FY2005.
7. Ending Date	C	No field activity for the project could be documented after 1969 although discussions, budgets, and schedules for the project occurred throughout 1970. A symposium on the Utah Experiment was held in early 1971. The Project Utah nuclear in situ retorting experiment stalled out in 1971.
8. Land Ownership	C	During May 2006, a review of the land status records on file at the Utah State Office of the Bureau of Land Management in Salt Lake City revealed that the Project Utah project area currently falls just outside the boundaries of the Ouray and Uintah Indian Reservation on land administered by the State of Utah. The WOSCO lease on the parcel has lapsed although there is a significant amount of commercial oil and gas development in the vicinity.
9. Agencies/Companies	C	The Western Oil Shale Corporation; U.S. Atomic Energy Commission, Headquarters, Washington, D.C.; U.S. Atomic Energy Commission, Nevada Operations Office; U.S. Bureau of Mines, Laramie Petroleum Research Center; U.S. Geological Survey; CER Geonuclear Corporation; Lawrence Radiation Laboratory; and Oak Ridge National Laboratory.

*C= complete, P= partial data, N= no data

WAGON WHEEL
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	<p>Project Wagon Wheel was a joint Plowshare effort between industry and the federal government to further develop the use of underground nuclear explosions to stimulate low permeability natural gas reservoirs. The driver behind the Wagon Wheel project was a perceived natural gas shortage in the United States and a desire to derive more gas from the underground gas-bearing geologic formations. It was the fourth such experiment, following the Gasbuggy, Rulison, and Rio Blanco projects. El Paso Natural Gas Company was the industrial sponsor of the project. Issues for Wagon Wheel were developing a specially designed nuclear explosive that could withstand the shock of the earlier detonations and still function properly and minimize the amount of radioactivity in the gas from the nuclear stimulated wells.</p>
2. Location	C	<p>The Project Wagon Wheel experiment area was located in the northern portion of the Green River Basin, Sublette County, Wyoming, about 20 miles south of the town of Pinedale and 20 miles east of the town of Big Piney just off state Highway 351. The project was in the SE1/4NW1/4, of Sec. 5, T30N R108W. Locations for the three drill holes follow below:</p> <p>Wagon Wheel #1 Emplacement Hole; Pinedale Unit; Sublette County, Wyoming, 1,980 ft from the north line, 1,880 ft from the west line of Sec. 5, T30N R108W; 7,072 ft ground elevation;</p> <p>Wagon Wheel Water Well #1; Pinedale Unit; Sublette County, Wyoming, 1,980 ft from the north line, 1,880 ft from the west line of Sec. 5, T30N R108W; 7,072 ft ground elevation;</p> <p>Wagon Wheel Water Well #2; Pinedale Unit; Sublette County, Wyoming, 2,325 ft from the north line, 1,319 ft from the west line of Sec. 5, T30N R108W; 7,062 ft ground elevation.</p>

Wagon Wheel (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
3. Beginning Date	C	In 1958, the El Paso Natural Gas Company approached the U.S. Atomic Energy Commission with the possibility of using nuclear explosions to stimulate the gas-bearing formations in the Pinedale Unit, but the nuclear explosive technology at this time was not advanced enough to undertake the task. The idea was revisited in 1963 and finally entered the feasibility study stage in 1967 under the general designation of Pinedale gas stimulation. The project received the Wagon Wheel name in 1968.
4. Fieldwork Dates	C	Initial site selection field reconnaissance began in the summer of 1967. Preliminary studies to evaluate the experiment site began in June and July 1969. Drilling of the Wagon Wheel emplacement hole started in October 1969 and concluded 13 months later in November 1970. A radiological monitoring program was established in May 1971 in advance of the experiment. Because of growing environmental concerns and intense opposition from both the local population and the Wyoming congressional delegation, only minimal field activity occurred over the next two years. The project was placed on hold after federal funding was cut in 1974.
5. Fieldwork Description	C	Field activities and facilities associated with the project included grading and leveling the site area, drilling the Wagon Wheel emplacement hole and at least two water wells, constructing a huge mud pit surrounded by an embankment, building a series of concrete pads for equipment and the drill rig, excavating a waste disposal pit, and grading several dirt access roads. Facilities erected included the drill rig, several mobile support trailers, water tanks, fuel tanks, and a barbed wire fence surrounding the experiment site. The drill rig was relocated once the drilling was concluded in November 1970. The trailers and some of the equipment were removed when the project was abandoned in 1974-1975. The concrete pads, waste disposal pit with debris, fenced enclosure, and some abandoned equipment remained in place in August 2003.
6. Activity Level	C	Project Wagon Wheel was a Level 3 activity which corresponds to fieldwork including drilling the emplacement hole and two water wells and constructing support facilities. Geological, geophysical and hydrological characterizations of the geological

Wagon Wheel (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
6. Activity Level (cont.)		formations were made using the cores and measurements from the exploratory hole and water wells, as well as using data from the pre-existing wells in the surrounding area. The Wagon Wheel site was visited in FY2003.
7. Ending Date	C	The exact date for termination of the Wagon Wheel project has not been firmly established. The federal budget in 1974 did not include funding for tests in the Plowshare Program and this has often been cited as the leading cause for the projects demise. The Plowshare Program itself ended in 1975. In 1974 and 1975, the gas company used the well drilled for the nuclear stimulation experiment to conduct massive hydraulic fracturing tests. These tests determined that this hydraulic technique was not economically feasible.
8. Land Ownership	C	A visit to the Bureau of Land Management, Pinedale Resource Area Office provided some data concerning the land status of the Wagon Wheel project area. According to the agency's oil and gas leasing specialist, the Bureau of Land Management has legal jurisdiction over the former project site. Currently several companies are interested in re-developing the old Wagon Wheel lease although not the actual well. Ultra Resources plans on drilling at least three, and possibly more, new wells in and around the Wagon Wheel #1 location within the next year. Shell Oil Company is looking at developing a leasehold just south of the Wagon Wheel compound.
9. Agencies/Companies	C	Agencies/Companies included the U.S. Atomic Energy Commission, Nevada Operations Offices; El Paso Natural Gas Company; U.S. Department of Interior; U.S. Bureau of Reclamation; Lawrence Radiation Laboratory; U.S. Geological Survey; U.S. Bureau of Mines; U.S. Public Health Service, Southwestern Radiological Health Laboratory; U.S. Coast & Geodetic Survey; Isotopes, Inc.; John A. Blume & Associates; Battelle Memorial Institute; Terra Tek, Inc.; Core Labs, Inc.; Dames & Moore; H.J. Degenkolb & Associates; Eberline Instrument Corporation; Holmes & Narver, Inc.; Basis Magnesium, Inc.; University of Wyoming, Water Resources Research Center; Environmental Science Services Administration, Air Resources

Wagon Wheel (continued)

<i>CHARACTERISTIC DATA</i>	<i>STATUS*</i>	<i>DESCRIPTION</i>
9. Agencies/Companies (cont)		Laboratory; Science, Systems and Software, Applied Nuclear Division; Applied Nuclear Company; Walton Dry Hole Digger; Roden Drilling Company; Evitt Drilling Company; Birdwell Corporation; Oilwell Perforators; Moran Brothers Drilling Company; Wagon Wheel Information Committee; and U.S. Environmental Protection Agency.

*C= complete, P= partial data, N= no data

WASP
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	Designated WASP for Wyoming Atomic Stimulation Project, the experiment was a joint industry-sponsored and U.S. Atomic Energy Commission natural gas stimulation project using nuclear explosives to fracture low-permeability and high-pressure gas bearing sandstone reservoirs. The project's objectives were to demonstrate the economic feasibility of nuclear gas stimulation in tight sandstone formation as well as facilitating the engineering design of underground nuclear stimulation techniques.
2. Location	C	The Project WASP experiment area was located in the Green River Basin in southwestern Wyoming. Two sites, both in Sublette County near the town of Pinedale, were proposed for the experiment. The primary site was the Merna location approximately 24 miles northwest of Pinedale and 6 miles west of the Green River. The Merna site exploratory hole WASP 1-A was drilled in the NE1/4NW1/4, 2,303 ft from the south line and 1,532 ft from the west line of Sec. 28, T36N R112W. The alternate Daniel site was about 13 miles west of Pinedale located in the center of S1/2, Sec. 32, T34N R111W.
3. Beginning Date	C	The initial concept for the WASP gas stimulation experiment originated in early 1967.
4. Fieldwork Dates	C	Initial site selection field reconnaissance began in spring-summer 1967. The one and only test well, WASP 1-A, for the project was drilled between May 28 and November 7, 1969. Field evaluation for a second exploratory hole began in mid-November 1969 and continued into mid-1970. No additional field work is documented after the summer of 1970.

WASP (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
5. Fieldwork Description	C	A single test hole (WASP A-1) was drilled on a WASP group lease in Sec. 28, T36N R112W. Field activities and facilities associated with the project included the test well, a mud pit, as well as the drill rig and several temporary support trailers. An existing dirt access road into the site was re-graded. The drill rig and trailers were relocated once the drilling was concluded in November 1969.
6. Activity Level	C	Project WASP was a Level 3 activity which corresponds to fieldwork limited to drilling the WASP 1-A test hole and re-grading the access road. Geological, geophysical and hydrological characterizations of the geological formations were made using the cores and measurements from the test hole as well as using data from the pre-existing wells in the surrounding area. An unsuccessful attempt to visit the Project WASP Merna site was made in FY2003.
7. Ending Date	C	No field activity for the Merna site could be documented after 1969. Field siting for a second exploratory hole is discussed in various documents, but no specific location or descriptions of field work were reported. Despite that budgets and schedules for a second exploratory hole and the nuclear experiment occurred throughout 1970. The last mention of Project WASP came in a 1975 document that indicated the experiment had last been scheduled for FY1973 or FY1974, but had not yet occurred.
8. Land Ownership	C	Historic documentation indicated that both the primary Merna site and the alternate Daniel site were on land for which the WASP industrial group held the oil and gas leases at the time of the proposed experiment. Land status research conducted during an August 2003 visit to the Bureau of Land Management, Pinedale Field Office revealed that the experimental sites are currently in an area of “split estate” mineral rights meaning the land had private surface and federal subsurface mineral rights. There were no special use permits or temporary withdrawals on file for the subject parcels.

WASP (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
9. Agencies/Companies	C	Participants included the U.S. Atomic Energy Commission, San Francisco and Nevada Operations Offices; Wyoming Atomic Stimulation Project group; International Nuclear Corporation; Oil & Gas Futures, Inc.; Burnham & Company; CRA, Inc.; Waymon G. Peavy; Petroleum Resources Company; Planet Oil & Mineral Corporation; U.S. Bureau of Mines, Bartlesville Petroleum Research Center; U.S. Geological Survey; Lawrence Radiation Laboratory; Los Alamos Scientific Laboratory; Sandia Laboratories; John A. Blume & Associates, Research Division; Battelle Memorial Institute, Columbus Laboratories; Environmental Research Corporation; Environmental Science Services Administration, Air Resources Laboratory; U.S. Public Health Service, Southwestern Radiological Health Laboratory; Holmes & Narver, Inc.; ATCOR Laboratories, Inc.; National Lead Company, Baroid Division; Halliburton Company; Dow Chemical Company, Dowell Division; and Brinkerhoff Drilling.

*C= complete, P= partial data, N= no data

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WEST VIRGINIA EARTHQUAKE
Vela Uniform Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	<p>The Department of Defense Advanced Research Projects Agency established a network of seismic monitoring stations to gather data from all types of seismic sources under the Long Range Seismic Measurements Program. The program was focused on the monitoring and detection efforts for foreign nuclear detonations, conventional explosives, and natural seismic events. The Long Range Seismic Measurements Program recorded a 3.95 magnitude earthquake in West Virginia that occurred along the state's southern border near the community of Beckley on November 25, 1964. Data gathering for the West Virginia Earthquake project included recordings from the permanent seismic installations at Wichita Mountains Seismological Observatory in Lawton, Oklahoma; the Blue Mountains Seismological Observatory in Baker, Oregon; the Uinta Basin Seismological Observatory in Vernal, Utah; the Cumberland Plateau Seismological Observatory in McMinnville, Tennessee; and the Tonto Forest Seismological Observatory, in Payson, Arizona. Mobile field teams scattered across the continental United States and southern Canada also documented the event. Thirty-six monitoring locations were used to record the West Virginia Earthquake. Twenty-five were situated west of the Mississippi. The West Virginia Earthquake provided valuable comparative data on seismic wave attenuation patterns and amplitude curves. With each project, improvements were made in the detection instrumentation and seismic systems. Because of the 1963 Test Ban Treaty, accurately determining the epicenter or hypocenter location became increasingly important in discriminating between natural and explosive seismic sources. The analysis of the data recalculated the location of the quake epicenter and adjusted the time of the event.</p>
2. Location	C	<p>The earthquake was located at 37°26'13"N Latitude 81°45'43"W Longitude, 13.3 km below the surface. The permanent and mobile recording stations were throughout the United States with some in southern Canada.</p>

West Virginia Earthquake (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
3. Beginning Date	C	The quake occurred on November 25, 1964 at 02:53:04 GMT.
4. Fieldwork Dates	C	The West Virginia Earthquake was on November 25, 1964 and mobile stations were likely visited after the quake.
5. Fieldwork Description	C	As with the other long range seismic measurements earthquake monitoring efforts, field activity for the New Madrid Earthquake was limited to the temporary placement of the mobile seismic observatories. Typically, the units were relocated shortly after recording a seismic event. Some locations, however, were reused frequently because of their proximity to the Nevada Test Site or active seismic zones.
6. Activity Level	C	The West Virginia Earthquake was a Level 4 activity with data gathered from existing instrumentation.
7. Ending Date	C	The Department of Defense report on the data analysis was completed on March 1, 1965.
8. Land Ownership	C	The epicenter of the earthquake was beneath Panther State Forest in West Virginia..
9. Agencies/Companies	C	The U.S. Department of Defense Advanced Research Projects Agency, Nuclear Test Detection Office; the U.S. Atomic Energy Commission; the United States Air Force, Air Force Technical Applications Center; the U.S. Coast and Geodetic Survey; and United Earth Sciences Division of Teledyne, Inc., Alexandria, VA.

*C= complete, P= partial data, N= no data

WHEELBARROW
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	The Wheelbarrow project (originally named Streetcar) was a proposed underground nuclear chemical experiment in a limestone medium with Plowshare applications. Of scientific interest was a prediction that a nuclear detonation in a limestone environment would produce large quantities of uncondensable gases that might significantly change the physical processes associated with the explosion. Limestone is commonly found with mineral and petroleum deposits and the Plowshare participants thought this experiment could provide valuable information for Plowshare applications in mining and petroleum recovery. The limestone experiment was approved for site selection as part of the Plowshare Program, probably in early 1962. West Virginia was seriously considered for the experiment. The state possessed the high purity limestone required for the project and West Virginia officials were actively seeking industrial applications for the use of nuclear explosives. Project personnel investigated four locations in the northeastern part of the state and they concluded that all met the criteria for high purity limestone. The initial design called for the construction of a shaft and adit for placement of the device and execution of the experiment. An exploratory drilling program would be needed to properly site the zero point. The Wheelbarrow project did not proceed to the next stage and was abandoned sometime in 1963.
2. Location	C	The four proposed locations were in the northeastern portion of West Virginia near the communities of Petersburg and Moorefield. Site No. 1 was located within the Monongahela National Forest. Situated closer to the Virginia border, Sites 2, 3, and 4 fell within the George Washington National Forest.
3. Beginning Date	C	The first public discussion of this limestone project was on March 13, 1962.

Wheelbarrow (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
4. Fieldwork Dates	C	Field investigations were conducted in West Virginia at the four proposed locations on September 12-13, 1962 by personnel from the Lawrence Radiation Laboratory, the Atomic Energy Commission's San Francisco and Nevada Operations offices, the West Virginia Geological Survey, and the general manager of the Germany Valley Limestone Corporation, a company conducting limestone mining in one of the site areas.
5. Fieldwork Description	C	The site investigation on September 12-13, 1962 involved only visual inspection of the four site areas and environs.
6. Activity Level	C	Wheelbarrow was a Level 5 project because it involved utilizing existing data and visual field inspections.
7. Ending Date	C	The last reference identified for Project Wheelbarrow appeared in a planning document for the Plowshare Program issued in March 1963 and there is no indication that this project was under consideration after 1963.
8. Land Ownership	C	All four locations were in the northeastern portion of the state near the communities of Petersburg and Moorefield. Site No. 1 was located within the Monongahela National Forest. Closer and almost next to the Virginia border, Sites 2, 3, and 4 fell within the George Washington National Forest. However, small private farms were scattered throughout the region creating access and land acquisition issues.
9. Agencies/Companies	C	Participants included the U.S. Atomic Energy Commission, Lawrence Radiation Laboratory, West Virginia Atomic Energy Committee, the West Virginia Geological Survey, the German Valley Limestone Corporation, the University of West Virginia, and the West Virginia Governor's Office.

*C= complete, P= partial data, N= no data

WHITESTONE NARROWS
Plowshare Program

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
1. Purpose/Scope	C	The project concept for Whitestone Narrows was to use nuclear explosives to make navigation channel improvements. During the 1960s, the U.S. Army Corps of Engineers, Alaska District investigated a number of alignments for improving navigation through the Whitestone Narrows and recommended channel improvements by removing rock formations on the north and south end of the channel. In 1968, the U.S. Army Engineer Nuclear Cratering Group issued a feasibility study for removing the rock hazards using nuclear explosives. According to the plan, a single 1 kt detonation would be used to excavate the rock protrusion at the south end of the channel and a 10 kt detonation to remove the rock mass at the northern end, excavating a channel to a depth of 24 ft. While removing the rock hazards in Whitestone Narrows was considered technically feasible, the detonation would result in blast material being deposited into the channel and dredging operations would be necessary to clear the channel. The cost of nuclear excavation coupled with the estimated cost of the dredging operation made the project uneconomical and the project was not recommended for a Plowshare application.
2. Location	C	Whitestone Narrows is at the southern end of Neva Strait, within the northern Alexander Archipelago in southeastern Alaska, about 15 miles northwest of Sitka. Neva Strait is a channel between Baranof Island and Partofshikof Island and is used by small craft traveling though the Alaska Inside Passage to and from Sitka, Alaska.
3. Beginning Date	C	A project to widen Whitestone Narrows by removing rock protrusions using conventional methods was investigated by the U.S. Army Corps of Engineers in the early 1960s. In 1964, the project was included as a suggested nuclear excavation project on a Nuclear Cratering Group list and a feasibility study for removing the rock hazards at Whitestone Narrows using nuclear explosives was issued in 1968.

Wyoming Coal Gasification (continued)

CHARACTERISTIC DATA	STATUS*	DESCRIPTION
4. Fieldwork Dates	C	No fieldwork was conducted.
5. Fieldwork Description	C	Not Applicable
6. Activity Level	C	Whitestone Narrows was a Level 5 activity. Activity was confined to conceptual design and background research.
7. Ending Date	C	The 1968 feasibility study did not recommend the project for a nuclear application.
8. Land Ownership	C	Whitestone Narrows is within the Tongass National Forest, administered by the U.S. Forest Service.
9. Agencies/Companies	C	Participants in the project included the U.S. Army Corps of Engineers, Alaska District, and the U.S. Army Engineer Nuclear Cratering Group.

*C= complete, P= partial data, N= no data

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Archambeault, G. T.	1972	10/02	Letter from G. T. Archambeault, Gallagher and Archambeault, Attorneys at Law, Glasgow, MT, to Donald Beckman, October 2. On file at: Fort Peck Archives, Corps of Engineers, Fort Peck, MT, Box 858.		Diamond Ore	
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Bates, Charles E.	1968	09/30	Letter from Charles C. Bates, Science Advisor, U.S. Coast Guard, to Glenn Werth, September 30. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA. File PLO-074.	Plowshare	North Slope Harbor	
Bates, Charles C.	1968	10/28	Letter from Charles C. Bates to John Kelly, October 28. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	North Slope Harbor	

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Bates, Charles C.	1969	03/28	Letter from Charles C. Bates to R E. Hammond ("Bob"), March 28. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	North Slope Harbor	
Bates, Charles C.	1969	03/28	Letter with Encls. (letter from R. W. Sexton, Southeastern Drilling, Inc., to C. C. Bates, March 21, letter from Harold James, U.S. Department of the Interior, to C. C. Bates, March 11) from Charles C. Bates, U.S. Coast Guard, to James H. Tormey, March 28. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	North Slope Harbor	
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Batzel, Roger E.	1974	03/22	Letter from Roger E. Batzel, Lawrence Livermore Laboratory, to Hon. Fortney H. Stark, Jr., March 22. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-027.	Plowshare		General, Correspondence
Batzel, Roger E.	1974	06/10	Telex from Roger E. Batzel, Lawrence Livermore Laboratory, to Senator Peter H. Dominick, June 10. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-118.	Plowshare	Copper Ore Chemical Mining	General, Status
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Betts, A. W.	1961	10/23	"Discussion of Ditchdigger." Memo from A. W. Betts to Chairman, et al., October 23. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0178458. Document Location?	Plowshare	Ditchdigger	
Black, R. A., and John C. Roller	1961	06/05	Results of Resistivity Measurements, Project Wagon No. 1 Site, Buckboard Mesa, Nevada Test Site. U.S. Department of the Interior, Geological Survey, Technical Letter, No. Wagon-1, June 5. Washington, D.C.	Plowshare	Wagon	
Black, Rudolph A., Garth B. Harlan, Kermit H. Larson, Robert E. Lyle, William S. Twenhofel, and Luke J. Vortman	1963	05/00	Project Rufus Site Selection: Reconnaissance Report – Alaska. Manuscript, Atomic Energy Commission, Nevada Operations Office, Las Vegas, NV, May. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Vela Uniform	Rufus	
Blankenship, T. H.	1969	02/14	"Initial Meeting of the Pinedale Joint Project Definition Group." Telex from T. H. Blankenship, U.S. Atomic Energy Commission, Nevada Operations Office, to L. Randolph et al., February 14. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-032.	Plowshare	Wagon Wheel	
Blue, C. L.	1958	09/24	"Project Plowshare." Memo from C. L. Blue, Lawrence Radiation Laboratory, to W. B. Reynolds, September 24. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900157, 2/18.	Plowshare	Katalla Harbor	
Blue, C. L.	1959	01/14	"Stanford Research Institute - Subcontract 122, Project Agreement No. 5." Letter with Encls. (letter from James H. Banistar, Stanford Research Institute, to C. L. Blue, January 9; letter from Richard M. Foose to Gerald Johnson, January 8) from C. L. Blue, Lawrence Radiation Laboratory, to W. B. Reynolds, January 14. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900157, 4/18.	Plowshare	San Clemente Island	

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Blue, C. L.	1960	02/03	"Project Agreement No. 5, Subcontract 122." Memo from C. L. Blue, Lawrence Radiation Laboratory, to W. B. Reynolds, February 3. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900157, 7/18.	Plowshare	San Clemente Island	
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Blue, C. L.	1960	02/29	"K Division Core Drilling - Hawaii." Memo from C. L. Blue, Lawrence Radiation Laboratory, to Distribution, February 29. On file at: Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900157, 7/18.	Plowshare	Iki	
Blue, C. L.	1960	03/17	"Plowshare Activities." Memo from C. L. Blue, Lawrence Radiation Laboratory, to W. B. Reynolds, March 17. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900157, 7/18.	Plowshare		General, Correspondence
Blue, C. L.	1960	03/24	Letter from C. L. Blue, Lawrence Radiation Laboratory, to Paul Spain, March 24. On file at: Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900157, 7/18.	Plowshare	Iki	
Blue, C. L.	1960	06/21	"University of Hawaii - P.O. 6731307." Memo with Encl. ("Appendix A to Purchase Order No. 6731307") from C. L. Blue, Lawrence Radiation Laboratory, to D. A. Bruce. On file at: Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900157, 7/18.	Plowshare	Iki	
Blue, C. L.	1960	06/21	"Nat Whiton, Drilling Contractor, Honolulu, Hawaii." Memo from C. L. Blue, Lawrence Radiation Laboratory, to D. A. Bruce, June 21. On file at: Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900157, 7/18.	Plowshare	Iki	

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Blue, C. L.	1963	07/02	"Purchase Order 3894205 Texas A & M Research Foundation Expired: June 30, 1963." Letter from C. L. Blue, Lawrence Radiation Laboratory, to P. M. Goodbread, July 2. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900157, 18/18.	Plowshare		General, Procurement
Blue, C. L.	1964	04/28	"Stanford Research Institute, Project Agreement No. 40, Contract AT(04-3)-115." Letter from C. L. Blue to P. M. Goodbread, April 28. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900205, 5/48.	Vela Uniform	Dribble	
Blue, C. L.	1964	06/15	"Proposed Purchase Order 1197903." Telex from C. L. Blue, Lawrence Radiation Laboratory, to R. A. Trybul, June 15. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900205, 4/48.	Plowshare		General, Procurement
Blue, C. L.	1964	07/24	"Project Agreement #40, Contract AT(04-3)-115, Stanford Research Institute." Letter from C. L. Blue to P. M. Goodbread, July 24. On file at: Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900205, 5/48.	Vela Uniform	Dribble, Salmon	
Blue, C. L.	1965	09/06	"Request for Approval - Procurement Action in Accordance with Contract 48, Modification 20, Article II, Mathematica, Inc. - Purchase Order 4711703 - CPFF." Letter from C. L. Blue to Office of the Manager, San Francisco Operations Office, September 6. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900205, 16/48.	Plowshare		General, Procurement
Blue, C. L.	1969	05/08	"Request for Execution Proposed Purchase Agreement LRL-7-1320-70." Letter with Encls. (memo to R. P. Connell, April 10, and Purchase Agreement) from C. L. Blue, Lawrence Radiation Laboratory, to R. P. Connell, May 8. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-90025, 47/48.	Plowshare		General, Procurement
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Blue, C. L.	1969	10/16	"Proposed Purchase Order 9907807 - Cost - \$6800 Pacific Missile Range." Letter from C. L. Blue to P. M. Goodbread, October 16. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-064.	Plowshare		General, Procurement
Blume, John A., and Associates	1965	08/00	Vela Uniform Program, Project Dribble, Salmon Event: Structural Response of Residential - Type Test Structures in Close Proximity to an Underground Nuclear Detonation. John A. Blume and Associates Research Division, Report No. VUF-1030, San Francisco, CA, August.	Vela Uniform	Dribble, Salmon	
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Boardman, Gene A.	1971	08/05	Plowshare Production Facility, Plowshare Explosive System Cost Summary, Plowshare Cost Study. Outlines, August 5. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare		General, Cost
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Boffey, Philip M.			Ernest J. Sternnglass: Controversial Prophet of Doom. <i>Science</i> , Vol. 166. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare		General, Radiation

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Bollen, Robert L., Walter G. Chesnut, V. Elaine Hatfield, and Georgellen Smith	1976	09/00	Predictions of Effects Produced by the Dice Throw Detonation on Experimental Microwave Links. Report to Defense Nuclear Agency, Report DNA 4183T, Washington, D.C., from Stanford Research Institute, Menlo Park, CA, September. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.		Dice Throw	
Borg, I. Y.	1971	12/31	Microscopic Examinations of Undeformed and Laboratory Deformed Wagon Wheel Rocks. In Project Wagon Wheel: Technical Studies Report, El Paso Natural Gas Company, editor, pp. 187-202. El Paso Natural Gas Company, Report PNE-WW-1, December 31. El Paso, TX. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Wagon Wheel	
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Bourque, Robert F.	1970	11/00	Project Trencher: Evaluation of Aluminized Blasting Agents for Cratering and Hole Springing. U.S. Army Engineer Nuclear Cratering Group, <i>NCG Technical Report No. 28</i> , November. Livermore, CA. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Trencher	
Bowyer, Ben	1965		"Current Status of Project Sloop." Memo from Ben Bowyer, U.S. Atomic Energy Commission, Civil Use Branch, to Files. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0038601.	Plowshare	Sloop	
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Bratton, J. K.	1976	09/07	"IAEA Fifth PNE Technical Committee Meeting." Letter from J. K. Bratton, Major General, U.S. Director of Military Application, to E. B. Giller, September 7. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Pacer	General, IAEA
Braun, R. L.	1972	04/17	"Report of Visit to the Mining, Metallurgical, and Fuels Engineering Department of the University of Utah." Memo from R. Braun, Lawrence Livermore Laboratory, to J. Kahn, April 17. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-087.	Plowshare	Copper Ore Chemical Mining	
Braun, R. L.	1972	12/20	"Trip Report, Symposium on the Management of Radioactive Wastes from Fuel Reprocessing." Memo from R. L. Braun, Lawrence Livermore Laboratory, to Distribution, December 20. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-109.	Plowshare		Storage, Radioactive Waste
Braun, R. L., A. E. Lewis, R. G. Mallon, C. J. Sisemore, H. A. Tewes, R. A. Hard, I. V. Klumpar, and L. J. Petrovic	1974	12/11	In Situ Leaching of a Nuclear Rubbilized Copper Deposit. Paper for presentation at the IAEA Conference, Vienna, Austria, January 20-24, University of California, Lawrence Livermore Laboratory, <i>Preprint UCRL-76281</i> , December 11. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-037.	Plowshare	Copper Ore Chemical Mining	
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Briggs, Joseph	1973	10/00	Project Armor Obstacle II. U.S. Army Engineer Waterways Experiment Station, Explosive Excavation Research Laboratory, <i>Miscellaneous Paper E-73-4</i> , October. Livermore CA. On file at: Fort Peck Archives, U.S. Army Corps of Engineers, Fort Peck, MT, Box 935.		Armor Obstacle	
Brim, G. V.	1972	09/14	"Intramural Order 9081509." Letter from G. V. Brim, University of California, to John Hiles, September 14. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-095.	Plowshare	Atlantic Gas Storage	
Brobeck, W. M.	1956	08/21	"Use of Energy from Explosion of Hydrogen Bomb to Generate Power." Memo from W. M. Brobeck to C. M. Van Atta, August 21. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900020, 24/26.	Plowshare		Application, Power Production
Brobeck, W. M.	1957	07/22	"Use of Atomic Bombs for Power Generation." Memo from W. M. Brobeck to Harold Brown, July 22. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900020, 24/26.	Plowshare		Applications, Power Production
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Brown, Larry P.	1974	09/25	Letter with Encl. ("Caddo Pine Island Oil Stimulation Project") from Larry P. Brown, Cities Service Oil Company, to John Toman, September 25. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-106.	Plowshare	Caddo Pine Island	
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Burke, Arleigh A.	1965	01/22	Letter with Encl. (Plowshare and the Bomb, Editorial, <i>Washington Star</i> , January 16) from Arleigh A. Burke to Editor, <i>Washington Star</i> , January 22. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-031.	Plowshare		General
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Cabriolet Site Characteristics			Cabriolet Site Characteristics (Plowshare Project), Appendix A. On file at: Nuclear Testing Archives, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0127458.	Plowshare	Cabriolet	
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Carlson, Roland H.	1959	05/14	Utilizing Nuclear Explosives in the Construction of Geothermal Power Plants. In Proceedings of the Second Plowshare Symposium, Part III, pp. 78-87. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-5677</i> , May 14. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Geothermal Power	
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Carlson, Roland H., and Robert T. Newell	1970	06/00	Ejecta from Single-Charge Cratering Explosions: Volume 1. Report to Sandia Laboratories, Albuquerque, NM, from The Boeing Company, Albuquerque, NM, June.	Plowshare	Tonopah 211	
Carpenter, H. C., H. W. Sohns, and G. U. Dinneen	1970	05/00	Oil Shale Research Related to Proposed Nuclear Projects, In <i>Symposium on Engineering with Nuclear Explosives: Proceedings</i> , Report CONF-700101, Vol. 2, pp. 1364-1375., May. American Nuclear Society, Hinsdale, IL.	Plowshare	Utah	
Carpenter, N. C.	1971	02/17	Rock Springs In Situ Work. In <i>Symposium on Oil Shale Retorting and Project Utah</i> , pp. 20-40, Western Oil Shale Corporation, Laramie, WY, February 17. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Utah	
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Carryall Project			Carryall Project - profile. Drawing. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Carryall	
Carter, Luther J.	1975	06/06	Peaceful Nuclear Explosions: Promises, Promises. <i>Science</i> , Vol. 188, June 6. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	PACER	General
Carter, Melvin W.	1968	04/08	Letter from Melvin W. Carter Public Health Service, Southwest Radiological Health Laboratory, to Donald G. Kurvink, April 8. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0162453.	Plowshare	Gondola	
Carter, Melvin W.	1969		Letter from Melvin W. Carter, Public Health Service, Southwest Radiological Health Laboratory, to Richard A. Johnson. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0134180.	Plowshare	WASP	
Carter, Melvin W.	1969	05/16	Letter from Melvin W. Carter, Public Health Service, Southwest Radiological Health Laboratory, to G. A. Jacobson, May 16. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0164640.	Plowshare	Gondola	
Caruso, Frederick C.	1969	12/04	Letter from Frederick C. Caruso, Montana Water Development Association, to Honorable John Melcher, December 4. On file at: Fort Peck Archives, U.S. Army Corps of Engineers, Fort Peck, MT, Box 860 Folder 1520-30.	Plowshare	Duck Creek Channel	
Casagrande, A.	1967	07/12	"Interoceanic Canal Studies Report of Technical Associates on Meeting of 7-9 June 1967." Letter/Report from A. Casagrande, Harvard University, Division of Engineering and Applied Physics, to Colonel R. P. Tabb, July 12. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		Phenomenology
Cassidy, William F.	1968	11/26	Letter from William F. Cassidy, U.S. Department of the Army, Office of the Chief of Engineers, to Floyd E. Dominy, November 26. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		General, NCG

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Cauthen, Lewis J., Jr.	1964	07/00	Survey of Shock Damage to Surface Facilities and Drilled Holes Resulting from Underground Nuclear Detonations. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-7964</i> , July. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-099.	Plowshare		General, Technical
Centre Daily Times	1968	04/00	Rep. Johnson Asks End to Project Ketch. <i>Centre Daily Times</i> , April. State College and Bellefonte, PA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Ketch	
Centre Daily Times	1968	04/09	Talk Scheduled on Project Ketch. <i>Centre Daily Times</i> , April 9. State College and Bellefonte, PA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Ketch	
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Centre Daily Times	1968	04/15	Scenic View Located Near Ketch Site. <i>Centre Daily Times</i> , April 15. State College and Bellefonte, PA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Ketch	
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Centre Daily Times	1968	04/16	Candidate Discusses Gas Blast. <i>Centre Daily Times</i> , August 16. State College and Bellefonte, PA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Ketch	

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Centre Daily Times	1968	06/14	Good Evening! Other Blasts Studied. <i>Centre Daily Times</i> , June 14. State College and Bellefonte, PA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Ketch	
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Chamberlain, Richard H.	1967	10/07	Letter from Richard H. Chamberlain, Hospital of the University of Pennsylvania, Department of Radiology, to Clifford L. Jones, October 7. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0061968.	Plowshare	Ketch	
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Chapin, Clair E.	1970	07/20	Letter from Clair Chapin, Lawrence Radiation Laboratory, to E. O. Dahle, July 20. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-098.	Plowshare	Geothermal Power	
Chapin, Clair E.	1970	08/28	"Applicability of Underground Nuclear Explosions to Geothermal Power Production." Memo from Clair E. Chapin, Lawrence Radiation Laboratory, to Distribution, August 28. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-098.	Plowshare	Geothermal Power	
Chapin, Clair E., D. W. Sherwood, W. H. Comtois, P. T. Walton, D. H. Stewart, and J. B. Burnham.	1971	04/00	A Feasibility Study of a Plowshare Geothermal Power Plant. U.S. Atomic Energy Commission, Report PNE 1550, April. Oakridge, TN. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Geothermal Power	
Chew, Eddie W.	1972		Release of Radioactivity from Wagon Wheel, In Project Wagon Wheel: Technical Studies Report Number Two, edited by Leo A Rogers, pp. G1-G16, Report PNE-WW-13.	Plowshare	Wagon Wheel	
Chong, Ken P., John P. Turner, and George F. Dana	1982	03/00	Mechanical Characterization of Oil Shale from Cowboy Canyon, North East Uinta Basin, Utah. Report to U.S. Department of Energy from University of Wyoming, Laramie, WY, March. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.			Oil
Christian Science Monitor	1964	03/20	Giant Plan Proposed: Water for a Continent. <i>The Christian Science Monitor</i> , March 20.	Plowshare	NAWAPA	

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Christopher, William G.	1967	03/27	An "L" Shaped Row Charge Cratering Experiment. Lawrence Radiation Laboratory, U.S. Army Engineer Nuclear Cratering Group, <i>NCG Technical Memorandum</i> No. NCG TM 67-5, March 27. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-090.	Plowshare	Zulu	
Christopher, W. G., and J. E. Lattery	1969	02/00	Project Pre-Gondola I, Crater Studies: Surface Motion. Lawrence Radiation Laboratory, U.S. Army Engineer Nuclear Cratering Group, Report PNE 1107 Part II, February. Livermore, CA. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA (cover page only).	Plowshare	Pre-Gondola	
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Circeo, Louis J.	1962	09/27	Preliminary Investigation, The Use of Nuclear Excavation for the Construction of an Interstate Highway between San Diego and the Imperial Valley. Paper to be presented at the San Diego Industrial Development Council, San Diego, CA, September 27. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-100.	Plowshare	San Diego - Imperial Valley Interstate	
Circeo, Louis J.	1962	12/11	"Yukon River Diversion." Letter from Louis J. Circeo, Lawrence Radiation Laboratory, to Colonel C. Hamburger, December 11. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	Yukon River Diversion	
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Circeo, Louis J.	1964	01/09	Letter from Louis J. Circeo, Lawrence Radiation Laboratory, to J. A. Keetch, January 9. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Miscellaneous	

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Circeo, Louis J.	1964	07/10	Barrier Planning with Nuclear Cratering Explosives. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-7966</i> , July 10. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-035.	Plowshare		Applications, Other, Barrier Planning
Cities Service Oil Company	1974	08/08	Caddo Pine Island Stimulation Project. Agreement between Cities Service Oil Company, Lawrence Livermore Laboratories, and Energy Oil and Gas Corporation. On file at Archives and Research Center, Lawrence Livermore National Laboratories, Livermore, CA, PLO-106.	Plowshare	Caddo Pine Island	
City of Burbank	1977	06/00	Site-Specific Analysis of Hybrid Geothermal/Fossil Power Plants. U.S. Energy Research and Development Administration, Division of Geothermal Energy, Report TID-27926, June. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Geothermal Power	
Clarke, F. J.	1969	12/30	Letter from F. J. Clarke, Department of the Army, Office of the Chief of Engineers, to Honorable Mike Mansfield, December 30. On file at: Fort Peck Archives, U.S. Army Corps of Engineers, Fort Peck, MT, Box 860 Folder 1520-30.	Plowshare	Duck Creek Channel	
Claassen, Hans C. and Edwin H. Cordes	1975	09/00	Two-Well Recirculating Tracer Test in Fractured Carbonate Rock, Nevada. <i>Hydrological Sciences-Bulletin-des Sciences Hydrologiques</i> , Vol. 20, No. 3, pp. 367-382, September. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.		Amargosa Desert	
Cleland, L. L., G. C. Corynen, and A. Maimoni	1977	06/14	Foreign Trip Report. Report from Lawrence Livermore Laboratory, Livermore, CA, June 14. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-028.	Plowshare		General, IAEA
Coal Age	1967	09/00	Project Thunderbird...A Nuclear Trigger for Coal Gasification. <i>Coal Age</i> , pp. 64-68, September.	Plowshare	Thunderbird	

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Coffer, Henry F.	1970	12/23	"Project Utah." Letter from Henry F. Coffer, CER Geonuclear Corporation, Las Vegas, NV, to Distribution, December 23. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-065.	Plowshare	Utah	
Coffer, Henry F.	1970	12/29	Letter from H. F. Coffer, CER Geonuclear Corporation, Las Vegas, NV, to Distribution, December 29. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, PLO-065.	Plowshare	Utah	
Coffer, Henry F.	1970	12/30	Letter with Encl. (Project Utah Proposal, manuscript) from Henry F. Coffer, CER Geonuclear Corporation, to Glenn C. Werth, December 30. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, PLO-065.	Plowshare	Utah	
Coffer, Henry F.	1971	01/27	"Project Utah." Letter from Henry F. Coffer, CER Geonuclear Corporation, Las Vegas, NV, to Glenn C. Werth, January 27. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, PLO-065.	Plowshare	Utah	
Coffer, Henry F.	1971	02/17	Introduction. In <i>Symposium on Oil Shale Retorting and Project Utah</i> , p. 1, Western Oil Shale Corporation, February 17. Laramie, WY. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Utah	
Coffer, Henry F.	1972	05/12	Letter with Encl. ("Geothermal Program Schedule 18th Annual Meeting of the American Nuclear Society, Civil Explosion Application Division, June 18 - 21, 1972") from Henry F. Coffer, CER Geonuclear Corporation, May 12. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-098.	Plowshare	Geothermal Power	
Coffer, H. F., and G. H. Higgins	1970		Future Contained Nuclear Explosives Experiments. In <i>Education for Peaceful Uses of Nuclear Explosives</i> , Lynn E. Weaver, editor, pp. 45-63. University of Arizona Press, Tucson, AZ.	Plowshare	Bronco, Dragon Trail, Ketch, Rulison, Sloop	
Cohen, Gerald D., and Francis M. Sand	1967	08/31	Water Resource Applications, Underground Storage of Natural Gas, and Waste Disposal Using Underground Nuclear Explosions. <i>Mathematica</i> , August 31. Princeton, New Jersey. U.S. Atomic Energy Commission, Report PNE 3008. Washington, D.C. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV and Defense Threat Reduction Information Center, Albuquerque, NM.	Plowshare	Red Lake, Ketch; other unnamed potential projects	Applications, Water Resource, Storage, Natural Gas, Waste

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Cohen, Jerry J.	1971	01/08	"Summary of Investigations into Sewage Disposal by Plowshare Methods." Memo from J. J. Cohen, Lawrence Radiation Laboratory, to A. E. Lewis, January 8.	Plowshare	Modesto Waste Disposal, Lake Tahoe Sewage, Livermore Valley Sewage	Applications, Storage, Waste
Cohen, J. J., R. L. Braun, L. L. Schwartz, and H. A. Tewes	1974	11/30	Economic and Environmental Evaluation of Nuclear Waste Disposal by Underground In Situ Melting. University of California, Lawrence Livermore Laboratory, <i>Report UCRL-51713</i> , November 30. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-109.	Plowshare	Radioactive Waste	
Cohen Jerry J. and T. A. Gibson, Jr.	1970	07/10	"Radioactive Waste Disposal: Appraisal of Plowshare Prospects and Recommendations for K-Division Actions." Memo from J. J. Cohen and T. A. Gibson, Jr., Lawrence Radiation Laboratory, to A. Holzer and G. C. Werth, July 10. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-109.	Plowshare	Radioactive Waste	
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Collins, Albert T.	1969	09/24	Alaska Harbor Created by N-Blast Being Studied. <i>Houston Chronicle</i> , Section 4, p. 2, September 24. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	North Slope Harbor	
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Commonwealth	1968	07/01	"Operation Plowshare, The Gold Dilemma & Earth Shaking Power," by Hon. Craig Hosmer. Announcement, <i>Commonwealth</i> , Vol. 62, No. 27, July 1. San Francisco, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-098.	Plowshare	Gold Leaching	
Commonwealth of Pennsylvania	1967		Proposed Statement (Project Ketch). Statement from Commonwealth of Pennsylvania. Harrisburg, PA. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0188115.	Plowshare	Ketch	
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Connell, Richard P.	1967	07/18	Letter from Richard P. Connell, Lawrence Radiation Laboratory, to J. S. Kelly, July 18. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900205, 19/48.	Plowshare		General, Budget
Connell, Richard P.	1967	11/13	Telex from R. P. Connell, Lawrence Radiation Laboratory, to S. G. English, November 13. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900205, 19/48.	Plowshare		General, Cost
Connell, Richard P.	1968	02/16	Letter from R. P. Connell, Lawrence Radiation Laboratory, to E. C. Shute, February 16. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cabriolet	
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Crawford, Todd V.	1969	06/25	"Alaskan Harbor and the LTBT." Memo from Todd V. Crawford, Lawrence Radiation Laboratory, to Distribution, June 25. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074 [OUO].	Plowshare	North Slope Harbor	
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Dolenc, Max R., Dean V. Power, C. T. Hamlett, and H. Samaniego	1972	08/25	Cultural and Environmental Survey Studies – 1971. Manuscript (PNE-WW-19), El Paso Natural Gas Company, El Paso, TX, August 25. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Wagon Wheel	
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Douglass, W. D.	1966	10/12	"Communication from Joseph M. Feutsch." Memo from W. D. Douglass, Lawrence Radiation Laboratory, to Gary Higgins, October 12. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-087.	Plowshare	TTR	
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Dowell, Edwin E.	1967	10/04	"Sloop Public Announcement Status Summary." Memo from Edwin E. Dowell, Kennecott Copper Corporation, to Rodney L. Southwick, October 4. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0162254.	Plowshare	Sloop	
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Duncan, Jack	1964	06/08	"Placing Nuclear Explosives in Wells." Memo from Jack Duncan, Lawrence Radiation Laboratory, to G. Johnson, June 8. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Emergency Capability Program	
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Dunlap, H. F.	1966	03/08	Letter from H. F. Dunlap, The Atlantic Refining Company, Dallas, TX, to Gary H. Higgins, March 8. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File Plo-105.	Plowshare		General, Correspondence
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Ege, J. R., R. D. Carroll, R. J. Way, and J. E. Magner	1968		Evaluation of Core Data, Physical Properties, and Oil Yield, USBM/Atomic Energy Commission Colorado Core Hole No. 3 (Bronco BR-1). Interagency Report Oil Shale-1. Special Projects Branch, U.S. Geologic Survey, Denver, CO.	Plowshare	Bronco	
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Elkins, Lloyd E., Richard Garwin, Ted Greenwood, Claude Hocott, Henry Jacoby, Gerald W. Johnson, Richard Morse, and F. A. Long (Chairman)	1975	04/00	An Analysis of the Economic Feasibility, Technical Significance, and Time Scale for Application of Peaceful Nuclear Explosions in the U.S., with Special Reference to the GURC Report Thereon. Report to U.S. Arms Control and Disarmament Agency from The Program on Science, Technology and Society, Cornell University, Ithaca, NY, April. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-028.	Plowshare	Copper Ore Chemical Mining, PACER,	General, Overview, Evaluation
Ellett, D. M.	1973	06/00	Comparison of Post-Shot Prediction and Recorded Response to an Airblast. Sandia Laboratories, Technical Memorandum No. SLA-73-0337, June. Albuquerque, NM.	Plowshare	Trinidad	
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English, S. G.	1968	04/05	Letter with Encl. ("Discussions with the Department of the Interior on Gold Leaching," memo from John S. Kelly to Chairman Seaborg, et al.) from S. G. English, U.S. Atomic Energy Commission, to Michael M. May, April 5. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-098.	Plowshare	Gold Leaching	
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Express	1968	06/15	Project Ketch' Program on WPSX-TV Monday 10 p.m. <i>Express</i> , June 15. Lock Haven, PA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Ketch	
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Fenix & Scisson, Inc.	1967	11/06	Project Payette: Phase I - A Study of the Technical Feasibility of Constructing a Large Cavity in Tatum Salt Dome. Report to U.S. Atomic Energy Commission, Nevada Operations Office, from Fenix & Scisson, Inc, Tulsa, OK and Petroleum Consultants, Houston, TX, November 6. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-031.	Vela Uniform	Payette	
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Flangas, William G., and David D. Rabb	1961	09/26	Nuclear Explosives in Mining. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-6636</i> , September 26. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-102.	Plowshare	Copper Recovery, Sloop	Applications, Mining, Block Caving
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Forrest, Robert M., and Richard S. Hague	1967	07/00	Project Ketch: A Feasibility Study on Creating Natural Gas Storage with Nuclear Explosions. U.S. Atomic Energy Commission, Report PNE 1200, July. Washington, D.C. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0176867; and Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Ketch	
Fowler, Glenn A.	1964	06/30	"Plowshare Emergency Capability Program." Letter with Encls. (Technical Proposal Cost Estimate and memo from F. J. Circeo, Lawrence Radiation Laboratory, to M. D. Nordyke, April 29) from Glenn A. Fowler, Sandia Corporation, to G. H. Higgins, June 30. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Emergency Capability Program	
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Frank, G. W.	1969	09/30	Letter from G. W. Frank, Austral Oil Company, Inc., to Glenn Werth, September 30. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	North Slope Harbor	
Frank, James, and John Nuckolls	1959	12/17	"The Pre-Vintage Experiment." Memo from James Frank and John Nuckolls to Frank Adelman, December 17. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-105.	Plowshare	Pre-Vintage	
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Frank, W. J.	1964	05/11	The Characteristics of Nuclear Explosives. University of California, Lawrence Radiation Laboratory, Report UCRL-7870, May 11. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-104.	Plowshare		General, Assessment

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Fry, John G., Roy A. Stane, and W. H. Crutchfield	1964	01/00	Preliminary Design Studies in a Nuclear Excavation - Project Carryall. In <i>Symposium on Nuclear Excavation Abridgments</i> presented at the 43rd Annual Meeting of the Highway Research Board, National Academy of Sciences - National Research Council, Washington, D.C., January, pp. 11-16. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-7632</i> . Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-34.	Plowshare	Carryall	
Fulton, R. B.	1970	09/02	Letter from R. B. Fulton, Newmont Mining Corporation, New York, NY, to Anthony H. Ewing, September 2. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-087.	Plowshare	Newmont, Copper Ore Chemical Mining	
Fulton, R. B.	1971	03/15	Letter from R. B. Fulton, Newmont Exploration Limited, New York, NY, to A. E. Lewis, March 15. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-089.	Plowshare	Alaska Copper Leaching	
Fuquay, J. J.	1969	06/04	Letter from J. J. Fuquay, Battelle Northwest, Richland, WA, to Gary H. Higgins, June 4. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-072.	Plowshare	Yawl	
Furumoto, A .S.	1976		A Coordinated Exploration Program for Geothermal Sources on the Island of Hawaii. In Proceedings from United Nations Symposium on the Development and Use of Geothermal Resources, Second Meeting, Vol. .2, pp. 993-1001, May 1975. San Francisco, CA. Document Location?	Plowshare	Iki	
Gaberson, J. B.	1971	11/05	Press Release, Subject: Technology developed under the U.S. PNE program may be useful in disposing radioactive wastes, from Lawrence Radiation Laboratory, November 5. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Radioactive Waste	
Gahin, Fikry S.	1971	01/07	Letter from Fikry S. Gahin, University of Utah, to B. Shore and response, January 7. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-027.	Plowshare		General, Radiation
Gallacher, Barney, Wade Dickinson, Ray Walker, Harlan Zodtner, and Louis Circeo	1962	11/13	Preliminary Investigation, The Use of Nuclear Explosives for the Excavation of the Boca Bypass. Report from Southern Pacific Railway, Bechtel Construction Company, and Lawrence Radiation Laboratory, September 13. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-100.	Plowshare	Boca Bypass Project	

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Gambs, Gerard C.	1969	07/29	Letter from Gerard C. Gambs, Gibbs & Hill, Inc., New York, NY, to Michael M. May, July 29.	Plowshare	Thunderbird	
Ganus, William J.	1970	05/00	Geohydrological Investigations. In <i>Symposium on Engineering with Nuclear Explosives: Proceedings</i> , Report CONF-700101, Vol. 2, pp. 1174-1183, May. American Nuclear Society, Hinsdale, IL.	Plowshare	Aquarius	
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Garberson, Jeffrey B.	1971	10/05	"Westinghouse Radio Questions on Livermore Plowshare Waste Disposal Proposal." Memo from Jeffrey B. Garberson, Lawrence Radiation Laboratory, to File, October 5. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		General, Waste Disposal
Garcia, W. J., Jr.	1970	10/20	Water Waves Produced by Cratering Explosions in Shallow Water. University of California, Lawrence Livermore National Laboratory, <i>Report UCRL-50940</i> , October 20. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-036.	Plowshare	Tugboat	Misc.
Gard, L. M., and J. W. Hasler	1963	09/25	Geology of Proposed Schooner Site, Bruneau River Area, Owyhee County, Idaho (A Preliminary Investigation), Technical Letter: Schooner-3. Report to U.S. Atomic Energy Commission, Las Vegas, NV, from U.S. Department of the Interior Geological Survey, Denver, CO, September 25. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0172861.	Plowshare	Pre-Schooner	

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Garretson, Fred	1963	06/30	State May Atom-Blast for Water. <i>Oakland Tribune</i> , June 30. Oakland, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-109.	Plowshare	California Water Plan, Feather River	
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Gates, Richard H.	1972	07/10	"Site Improvement." Letter from Richard H. Gates, U.S. Army Engineer Waterways Experiment Station Explosive Excavation Research Laboratory, to D. Beckman, Area Manager, Fort Peck Lake Area, July 10. On file at: Fort Peck Archives, U.S. Army Corps of Engineers, Fort Peck, MT, Box 858.	Plowshare	Diamond Ore, Pre-Gondola, Trencher	
Gates, Richard H.	1972	09/21	"OCE Research Associate for LLL." Memo from Richard H. Gates, USAEWES Explosive Excavation Research Laboratory, Corps of Engineers, to Director, September 21. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		General, EERL
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Geotechnical Corporation	1962		New Madrid Earthquake, February 2, 1962: Long Range Seismic Measurements Project 8.4. Report to Air Force Technical Applications Center from Geotechnical Corporation, Dallas, TX. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV. Document Location?	Vela Uniform	New Madrid Earthquake	

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Gerber, Carl R.	1972		Letter from Carl R. Gerber, U.S. Atomic Energy Commission, to Norman F. Ramsey. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-028.	Plowshare		General, GAC
Gerber, Carl R.	1972	03/08	Letter from Carl R. Gerber, U.S. Atomic Energy Commission, to Glenn C. Werth, March 8. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-028.	Plowshare		General, GAC
Gerber, Carl R.	1972	03/08	Letter with Encls. (Plowshare Review Subcommittee of the General Advisory Committee and General Advisory Committee Meeting Schedule) from Carl R. Gerber, U.S. Atomic Energy Commission, to Thomas B. Cook, Jr., March 8. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-028.	Plowshare		General, GAC
Gibson, T. A.	1970	05/04	"The Economic Constraints of Radioactive Waste Disposal with Nuclear Explosives --or: Is There a Place for Nuclear Explosives in Radioactive Waste Disposal?" Memo from T. A. Gibson, Lawrence Radiation Laboratory, to A. Lewis, May 4. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-109.	Plowshare	Radioactive Waste	
Gilbert, Donald C.	1970	08/17	Letter from Donald C. Gilbert, State of Arizona Atomic Energy Commission, to R. E. Hollingsworth, August 17.	Plowshare		General
Gillespie, Richard H.	1971	11/00	Project Sergius Narrows - Summary of Tests on Liesnoi Island, Alaska, 1970. U.S. Army Engineer Explosive Excavation Research Office, Technical Report No. 33, November. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-092.	Plowshare	Sergius Narrows	
Ginsburg, Theodore	1960	11/02	The Peaceful Application of Nuclear Bombs. <i>Neue Zurcher Zeitung</i> , Foreign Edition, No. 152, 9011. Zurich, Switzerland. University of California, Lawrence Radiation Laboratory, UCRL Trans. 790 (L).	Plowshare		General
Ginsburg, Theodore	1961	06/29	The Peaceful Uses of Nuclear Bombs in Civil Engineering. <i>Neue Zurcher Zeitung</i> , Foreign Edition, No. 176, pp. 18-21. Zurich, Switzerland. University of California, Lawrence Radiation Laboratory, UCRL Trans. 717 (L). On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-100.	Plowshare		Applications

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Goeckermann, Robert H.	1964	06/25	Letter with Encl. ("Minutes of the Dribble Advisory Panel") from Robert H. Goeckermann, Lawrence Radiation Laboratory, to James E. Reeves, June 25. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-013.	Vela Uniform	Dribble	
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Goodbread, P. M.	1966	09/23	Letter from P. M. Goodbread, U.S. Atomic Energy Commission, San Francisco Operations Office, to W. B. Harford, September 23. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900205, 16/48.	Plowshare		General, Purchase Order
Goris, Charles A.	1962	09/21	Trip Report - West Virginia Site Investigation - Project Wheelbarrow." Memo from Charles A. Goris, U.S. Atomic Energy Commission, Nevada Operations Office, to William D. Smith, September 21. On file at: Nuclear Testing Archives, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0309952.	Plowshare	Wheelbarrow	
Gosling, F. G.	1999	01/00	<i>The Manhattan Project: Making the Atomic Bomb.</i> United States Department of Energy. Washington, D. C.			General
Graves, Ernest	1961	01/05	"Investigation of Craters Produced in Steep Slopes." Memo from Ernest Graves, Lawrence Radiation Laboratory, to W. N. Hess, January 5. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Nuclear Excavated Spillway	
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Graves, Ernest	1964	01/10	Letter with Encls. (Semiannual Progress Report for Period 1 July 1963 - 31 December 1963 and Proposed Outline for Manual on The Use of Nuclear Explosives for Military Engineering Purposes) from Ernest Graves, Lawrence Radiation Laboratory, U.S. Army Engineer Nuclear Cratering Group, Corps of Engineers, to Gerald W. Johnson, January 10. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		General, NCG
Graves, Ernest	1964	02/04	"Status Report - Nuclear Explosives Studies for Civil Construction (Reports Control Symbol ENGCE-E-9)." Letter with Encl. ("Status Report, Effective Date: 31 December 1963 - ENGCE-E-9") from Ernest Graves, Lawrence Radiation Laboratory, U.S. Army Engineer Nuclear Cratering Group, to Chief of Engineers, Department of the Army, February 4. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Chomly Cutoff, Fort Worth District, Hawaii Harbor, Kaunakakai, South Point	General, NCG
Graves, Ernest	1964	03/03	Letter with Encls. (Test Facility Design, Sandpit Cratering Curves, Proposed Model Series) from Ernest Graves, Jr., Lawrence Radiation Laboratory, U.S. Army Engineer Nuclear Cratering Group, to Gerald W. Johnson, March 3. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Zulu	
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Grebe, John J.	1964	10/09	Letter from John J. Grebe to Arvi O. Waananen, October 9. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Miscellaneous	
Grebe, John J., and Alden W. Hanson	1958	04/07	Letter with Encls. (appendices) from John J. Grebe and Alden W. Hanson, Dow Chemical company, Midland, MI, to Willard F. Libby and Gerald W. Johnson, April 7. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-109.	Plowshare	Miscellaneous	
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Green, J. B., Jr.	1971	01/28	"Possible Peaceful Applications of Nuclear Explosive by the U. S. Navy." Memo from J. B. Green, Jr., Lawrence Radiation Laboratory, to Glenn C. Werth, January 28.	Plowshare	Undersea Fuel Oil Storage, Miscellaneous	
Green, Joseph B., Jr.	1972	03/00	The New Look of Plowshare. University of California, Lawrence Radiation Laboratory, <i>Preprint UCRL-73797</i> , March. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		Applications, Overview
Green, Michael A., and Howard S. Pines	1975	05/00	Calculation of Geothermal Power Plant Cycles Using Program GEOTHM. University of California, Lawrence Berkeley Laboratory, Report No. LBL-3238, May. Berkeley, CA. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Geothermal Power	
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Grier, Herbert E.	1975	02/07	Letter from Herbert E. Grier, CER Geonuclear Corporation, Las Vegas, NV, to J. Wade Watkins, February 7. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-095.	Plowshare		Phenomenology High Explosive

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Griffin, Roger F..	1970	05/00	Aquarius Study - Engineering and Economic Considerations. In <i>Symposium on Engineering with Nuclear Explosives: Summaries</i> , p. 85, May. American Nuclear Society, Hinsdale, IL.	Plowshare	Aquarius	
Habbit, R. D., H. J. Patel, and R. F. Lemon	1971	12/31	Reservoir and Recoverable Gas Analysis. In Project Wagon Wheel: Technical Studies Report, El Paso Natural Gas Company, editor, pp. 153-178. El Paso Natural Gas Company, Report PNE-WW-1, December 31. El Paso, TX. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Wagon Wheel	
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Hair, J. L.	1969	03/00	Construction Techniques and Costs for Emplacement of Nuclear Explosives in Disturbed Media. Lawrence Radiation Laboratory, U.S. Army Engineer Nuclear Cratering Group, <i>NCG Technical Report</i> No. 10, March. Livermore. CA. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		Phenomenology Excavation
Hale, Verle Q., and R. Glen Fuller	1973	09/12	Preliminary Environmental Characterization of Candidate Sites for an Experimental Plowshare Copper Recovery Project. Manuscript, Battelle, Columbus Laboratories, Columbus, OH, September 12. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Copper Ore Chemical Mining	
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Hall, Roberta	1961	01/24	Letter from Roberta Hall, <i>The Daily Rocket</i> , Rock Springs Newspaper, Inc., January 24. n file to Lawrence Radiation Laboratory," The Daily Rocket, Rock Springs Newspapers, Inc., to Lawrence Radiation Laboratory, January 24. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-032.	Plowshare	Pinot	
Ham, Jerry D.	1975	07/28	Letter and response (from John Toman, October 17) from Jerry D. Ham, U.S. Energy Research and Development Administration, to John Toman, July 28. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-095.			Phenomenology High Explosive
Hamburger, Richard	1963	04/12	Letter from Richard Hamburger, U.S. Atomic Energy Commission, Division of Peaceful Nuclear Explosives, to Gaston L. Norgeot, April 12. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Cape Cod Canal	
Hamburger, Richard	1963	04/30	Letter from Richard Hamburger, U.S. Atomic Energy Commission, Division of Peaceful Nuclear Explosives, to Ira A. Huffman, April 30. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	San Diego - Imperial Valley Interstate	
Hamburger, Richard	1963	06/06	Letter from Richard Hamburger, U.S. Atomic Energy Commission, Division of Peaceful Nuclear Explosives, to Karl Brunstad, June 6. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Spiridon Lake	
Hamburger, Richard	1964	08/11	Letter with Encl. (Minutes of Portland Meeting, May 24, 1962) from Richard Hamburger, U.S. Atomic Energy Commission, Division of Peaceful Nuclear Explosives, to Gary H. Higgins, August 11. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Emergency Capability Program	
Hamburger, Richard	1964	10/22	Letter with Encl. (For Use at Seminar on Industrial Uses of Nuclear Energy, Idaho Falls, Idaho, October 15 and 16) from Richard Hamburger, U.S. Atomic Energy Commission, to Gary Higgins, October 22. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare		Applications, Excavation, Mining, Open Pit Mining, Block Caving, Copper

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Harvey, W. T.	1974	04/23	ESSEX - Diamond Ore Research Program: Preliminary Results Report - ESSEX-I, Phase 1, Nuclear Cratering Device Simulation (Project ESSEX). Defense Nuclear Agency, Report DNA PR 0002, U.S. Army Engineer Waterway Experiment Station, Report WES TR N-77-4, April 23. Washington, D.C. and Vicksburg, MS.		Diamond Ore, ESSEX	
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Howard, John H.	1973	01/15	"United Nations Seminar on Development and Use of Geothermal Energy." Memo from J. Howard, Lawrence Livermore National Laboratory, to Distribution, January 15. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-098.	Plowshare	Geothermal Power	
Howard, John H.	1973	01/22	"Scope and Validity of Patents 3,258,069 and 3,330,356 on Geopressure Energy Resource." Memo from J. H. Howard, Lawrence Livermore Laboratory, to F. A. Robertson, January 22. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-098.	Plowshare	Geothermal Power	
Howard, John H.	1973	02/12	Letter from J. H. Howard, Lawrence Livermore Laboratory, to Roland A. Anderson, February 12. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-098.	Plowshare	Geothermal Power	
Howard, John H.	1973	06/08	"Brief Statement of Developments Regarding the Geothermal Research Program." Memo from J. Howard, Lawrence Livermore Laboratory, to Jack Kahn, June 8. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-098.	Plowshare	Geothermal Power	
Howard, John H.	1973	07/17	Letter from J. H. Howard, Lawrence Livermore Laboratory, to Fred Terry, July 17. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-098.	Plowshare	Geothermal Power	
Howard, John H.	1973	07/20	"Geothermal Research Project, June 9, 1973, to July 18, 1973." Memo from J. Howard, Lawrence Livermore Laboratory, to Jack Kahn, July 20. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-098.	Plowshare	Geothermal Power	
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Huff, William L.	1979	09/00	ESSEX - Diamond Ore Research Program: POL Storage and Distribution Facilities Test, ESSEX V, Phase 3. U.S. Waterways Experiment Station, Report WES TR SL-79-6, September. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA; and Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.		ESSEX	
Huffman, Ira A.	1963	04/17	Letter from Ira A. Huffman, The Post and Press Newspapers, El Centro, CA, to U.S. Atomic Energy Commission, April 17. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	San Diego - Imperial Valley Interstate	

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Hughes, Bernard C.	1965	04/13	"Status Report - Nuclear Explosives Studies for Civil Construction (Reports Control Symbol ENGCW-E-9)." Letter with Encl. ("Status Report, Effective Date: 31 March 1965 - ENCGW-P-6(R1)") from Bernard C. Hughes, U.S. Army Engineer Cratering Group, to Chief for Engineers, Department of the Army, April 13. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Fort Bragg - Eureka Harbor, Camelsback Dam, Chomly Cutoff, Hawaii Harbor, Kaunakakai, South Point, Pre-Schooner II, Tennessee-Tombigbee Waterway, Zulu	General, NCG
Hughes, Bernard C.	1965	10/12	"Pre-Schooner II Interim Data Technical Report." Memo from Bernard C. Hughes, Lawrence Radiation Laboratory, U.S. Army Engineer Nuclear Cratering Group, to Distribution, October 12. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-054.	Plowshare	Pre-Schooner II	
Hughes, Bernard C.	1966	10/00	Project Pre-Schooner II: Technical Director's Summary Report. Lawrence Radiation Laboratory, U.S. Army Engineer Nuclear Cratering Group, Report PNE 507, October. Livermore, CA. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0015368.	Plowshare	Pre-Schooner II	
Hughes, Bernard C.	1968	01/13	"Status Report - Nuclear Explosives Studies for Civil Construction (RCS ENGCW-P-6 (R-1))." Letter with Encl. ("Status Report, Effective Date: 31 December 1967") from Bernard C. Hughes, Lawrence Radiation Laboratory, U.S. Army Engineer Nuclear Cratering Group, to Chief of Engineers, Department of the Army, January 13. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Bruneau Canyon Dam, Buchanan Dam, Fort Bragg - Eureka Harbor, Excavator, Kaunakakai Harbor, Pre-Gondola, Pre-Schooner II, Travois, Zulu	General, NCG
Hughes, Bernard C.	1968	02/02	Letter from Bernard C. Hughes, Lawrence Radiation Laboratory, U.S. Army Engineer Nuclear Cratering Group, to Glenn C. Werth, February 2. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-065.	Plowshare	Angledozer, Excavator, Travois	

AUTHOR	YEAR	MONTH/ DAY	TITLE AND DOCUMENT SOURCE	PROGRAM	PROJECT(S)	OTHER
Hughes, Bernard C.	1968	04/18	Letter from Bernard C. Hughes, Lawrence Radiation Laboratory, U.S. Army Engineer Nuclear Cratering Group, to Glenn C. Werth, April 18. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-065 [OUO].	Plowshare	Excavator, Travois	
Hughes, Bernard C.	1968	05/10	"Preliminary Planning Concept for Project Excavator." Letter from Bernard C. Hughes, Lawrence Radiation Laboratory, U.S. Army Engineer Nuclear Cratering Group, to Distribution, May 10. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-065.	Plowshare	Excavator	
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Hughes, Bernard C.	1968	06/11	"Meeting with Director of Idaho Water Resource Board." Memo from Bernard C. Hughes, Lawrence Radiation Laboratory, U.S. Army Engineer Nuclear Cratering Group, to Record, June 11. On file at: Archives and Research, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029 [OUO].	Plowshare	Bruneau Canyon Dam, Excavator, Travois	General, NCG
Hughes, Bernard C.	1968	08/00	Memo with Encl. (letter from William F. Roos, U.S. Army Corps of Engineers, Honolulu District, to Frank E. Midkiff, July 25) from Bernard C. Hughes, U.S. Army Engineer Nuclear Cratering Group, to Glenn Werth. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-078.	Plowshare	South Point Harbor	
Hughes, Bernard C.	1968	09/00	Nuclear Construction Engineering Technology. Lawrence Radiation Laboratory, U.S. Army Engineer Nuclear Cratering Group, <i>NCG Technical Report</i> No. 2, September. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-104.	Plowshare		Applications, Excavation, Dam, Harbor, Highways, Mining, Quarrying
Hughes, Bernard C.	1968	10/00	The Corps of Engineers Nuclear Explosives Studies for Civil Construction. Lawrence Radiation Laboratory, U.S. Army Engineer Nuclear Cratering Group, <i>NCG Technical Report</i> No. 8, October. Livermore, CA. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		Applications, Mining, Quarrying, Excavation, Dam, Harbor, Cuts

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Hughes, Bernard C.	1969	01/00	History of the U.S. Army Engineer Nuclear Cratering Group. Lawrence Radiation Laboratory, January. Livermore, CA.	Plowshare	Pre-Buggy, Pre-Schooner, Pre-Gondola, Zulu, Buchanan Dam, Cochiti Dam, Twin Springs Dam, Rampart Canyon, Tennessee-Tombigbee, Chomly Cutoff, Camelsback Dam, Shelter Cove, Kaunakakai Harbor, Bruneau Canyon Dam, Yaquina Bay, Lake Erie – Ohio River Canal	General, NCG
Hughes, Bernard C.	1969	01/21	"Harbor Modeling Experiments." Memo with Encl. ("NCG Crater Modeling Studies," memo for Record, January 20) from Bernard C. Hughes, Lawrence Radiation Laboratory, to Glenn Werth, January 21. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Zulu	
Hughes, Bernard C.	1969	01/22	Nuclear Excavation Technology Pertaining to Harbor Development. Paper presented at meeting with Coast Guard, Corps, and PNE at USCG, January 22. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	North Slope Harbor	
Hughes, Bernard C.	1969	06/05	"Technical Concept for Project TUGBOAT." Memo from Bernard C. Hughes, Lawrence Radiation Laboratory, Corps of Engineers, Nuclear Cratering Group, to Distribution, June 5. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-065.	Plowshare	Tugboat	

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Hughey, Robert W.	1974	08/13	"Meeting of LLL/SAN/Cities Service Oil Company on Proposed Joint Project in Louisiana on Oil Stimulation, August 9, 1974 at LLL." Letter from Robert W. Hughey, U.S. Atomic Energy Commission, San Francisco Office, to Files, August 13. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-106.	Plowshare	Caddo Pine Island	
Hughey, Robert W.	1974	08/22	"Division of Responsibilities for Preparation of Environmental Assessments for LLL coal Gasification Projects." Letter with Encl. (Chart of Responsibilities) from Robert W. Hughey, U.S. Atomic Energy Commission, San Francisco Operations Office, to John Cowles et al., August 22. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.			General, Admin
Hughey, Robert W.	1974	08/26	Meeting at San on Proposed Joint AEC/Industry Project in Louisiana for Oil Stimulation, August 26, 1974 - (Reference: Memo to Files by R. W. Hughes Dated August 13, 1974, Re: Meeting with Cities Service Company on August 9, Same Subject)." Letter from Robert W. Hughey, U.S. Atomic Energy Commission, San Francisco Office, to Files, August 26. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-106.	Plowshare	Caddo Pine Island	
Hughey, Robert W.	1975	02/21	"Meeting with Cities Service, Tulsa, February 11, 1975." Letter from Robert W. Hughey, U.S. Energy Research and Development Administration, San Francisco Operations Office, to File, February 21. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-106.	Plowshare	Caddo Pine Island	
Hurlbut, S. W.	1963	12/09	Letter from S. W. Hurlbut, Anaconda Company, Mining Research Department, to G. H. Higgins, December 9. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-102.	Plowshare	Copper Recovery, Zinc Ore Recovery	
Ide, Roger H.	1968	11/25	Letter from Roger H. Ide, Lawrence Radiation Laboratory, to W. R. Cooper, November 25. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession Nos. NV0308620 and NV0309997.	Plowshare	Galley, Phaeton, Travois, Rockaway	
Industrial Research	1968	06/00	Preoccupied with Gold. <i>Industrial Research</i> , June. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-098.	Plowshare	Gold Leaching, Sloop	

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Ingram, Frank L.	1967	05/29	Meeting regarding activities in Water Saturated Shale Experiment, South Dakota. Telex from Frank L. Ingram, U.S. Atomic Energy Commission, to Henry G. Vermillion, May 29. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0188109.	Plowshare	Ketch	
Ingram, Frank L.	1967	08/15	"Pennsylvania Agrees to Phase I of Project Ketch." Letter from Frank L. Ingram, U.S. Atomic Energy Commission, Division of Public Information, to Files, August 15. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0188174.	Plowshare	Ketch	
Ingram, Frank L.	1969	02/06	Letter from Frank L. Ingram, U.S. Atomic Energy Commission, Division of Public Information, to Donald Kurvink, February 6. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0164632.	Plowshare	Gondola	
Ingram, Frank L.	1971	06/07	Press Release, Subject: Summary: Geothermal Power Plant, from U.S. Atomic Energy Commission, June 7. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0032604 and NV0147143.	Plowshare	Geothermal Power	
Ingram, L. F., and R. C. Holmes	1969	07/15	Mine Shaft Series Events Mineral Lode and Mineral Rock: Technical, Administrative, and Operational Plan. Report to Defense Atomic Support Agency, from DASA Information and Analysis Center, General Electric Company, DASIAC Special Report 97, Santa Barbara, CA, July 15.	DNA	Mine Shaft, Mineral Lode, Mineral Rock	
Ingvarsson, I. J., and S. E. Turner	1977		Working Fluid and Cycle Selection Criteria for Binary Geothermal Power Plants with Resource Temperatures in the Range of 220° F and 400° F. Idaho National Engineering Laboratory, <i>EG&G Idaho Inc., Report</i> , No. TREE-1108, April. Idaho Falls, ID. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Geothermal Power	
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International Atomic Energy Agency	1970	03/02	Peaceful Nuclear Explosions. Proceedings of a Panel on the Peaceful Uses of Nuclear Explosions, International Atomic Energy Agency, Vienna, Austria, March 2-6, 1970.	Plowshare		Symposium
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International Atomic Energy Agency	1975	01/20	French and Russian Presentations to the Meeting of the International Atomic Energy Agency's Technical Committee on the Peaceful Uses of Nuclear Explosions, Vienna, Austria, January 20-24, 1975. AWRE Translation, Translated by W. E. Jones. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-028.	Plowshare		General, IAEA
International Atomic Energy Agency	1975	02/14	Review of Activities in Connection with Nuclear Explosions for Peaceful Purposes: Note by Director General, International Atomic Energy Agency, February 14. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-028.	Plowshare		General, IAEA
International Atomic Energy Agency	1976		Notification of an Agency-Sponsored Meeting. Consultants' Meeting on the Economic Aspects of Peaceful Nuclear Explosions (PNEs), 15-19 March 1976. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-028.	Plowshare		General, IAEA
International Atomic Energy Agency	1976	03/15	Economic Aspects of Peaceful Nuclear Explosions (Draft). Report on Meeting of Consultants, March 15-19, 1976, Vienna, Austria. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-028.	Plowshare		General, IAEA
International Atomic Energy Agency	1976	03/22	Report by Consultants Meeting on Health, Safety and Environmental Aspects of Peaceful Nuclear Explosions (Draft). International Atomic Energy Agency, Vienna, Austria, March 22-26. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-028.	Plowshare		General, Health and Safety, IAEA

AUTHOR	YEAR	MONTH/ DAY	TITLE AND DOCUMENT SOURCE	PROGRAM	PROJECT(S)	OTHER
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International Atomic Energy Agency	1976	05/05	Nuclear Explosions for Peaceful Purposes: A Report of a Consultants Meeting on the Health, Safety and Environmental Aspects of Nuclear Explosions for Peaceful Purposes. Ad Hoc Advisory Group on Nuclear Explosions for Peaceful Purposes, May 5. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-028 [OUO].	Plowshare		General, Health and Safety, IAEA
International Atomic Energy Agency	1976	06/08	Provisional Text of the Record of the Fourth Meeting, Hofburg, Vienna, Austria, May 31, 1976. Ad Hoc Advisory Group on Nuclear Explosions for Peaceful Purposes, June 8. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-028 [OUO].	Plowshare		General, IAEA
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International Atomic Energy Agency	1976	06/09	Provisional Text of the Record of the Fifth Meeting, Hofburg, Vienna, Austria, June 2, 1976. Ad Hoc Advisory Group on Nuclear Explosions for Peaceful Purposes, June 9. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-028 [OUO].	Plowshare		General, IAEA
International Atomic Energy Agency	1976	06/14	Provisional Text of the Record of the Sixth Meeting, Hofburg, Vienna, Austria, June 3, 1976. Ad Hoc Advisory Group on Nuclear Explosions for Peaceful Purposes, June 14. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-028 [OUO].	Plowshare		General, IAEA
International Atomic Energy Agency	1976	06/14	Provisional Text of the Record of the Seventh Meeting, Hofburg, Vienna, Austria, June 8, 1976. Ad Hoc Advisory Group on Nuclear Explosions for Peaceful Purposes, June 14. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-028 [OUO].	Plowshare		General, IAEA

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International Atomic Energy Agency	1977	05/12	Draft Report of the Ad Hoc Advisory Group on Nuclear Explosions for Peaceful Purposes: Note by Director General. Ad Hoc Advisory Group on Nuclear Explosions for Peaceful Purposes, May 12. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-028 [OUO].	Plowshare		General, IAEA
International Nuclear Corporation	1969	01/21	Feasibility Study, Wyoming Atomic Stimulation Project. Manuscript, Denver, CO, January 21. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	WASP	
International Nuclear Corporation	1969	03/17	Evaluation Hole, Wyoming Atomic Stimulation Project. Manuscript, Denver, CO, March 17. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	WASP	
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Jack, H. A., and W. W. Dudley	1967	02/00	Project Pre-Gondola, Site-Selection Investigations. Lawrence Radiation Laboratory, U.S. Army Engineer Nuclear Cratering Group, <i>Report PNE 1101</i> , February. Livermore, CA. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Pre-Gondola	
Jackson, Melvin W.	1967	12/00	Ten Years of Plowshare. <i>Civil Engineering</i> , December. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Bronco, Cabriolet, Dragon Trail, Ketch, Pre-Schooner II, Sloop	General

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Jacobson, G. A.	1969	04/28	"Plowshare Surveillance - South Dakota." Memo from G. A. Jacobson, Department of Health, Education, and Welfare, to Director Southwest Radiological Health Laboratory, April 28. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0164635.	Plowshare	Gondola	
James, Harold L.	1968	07/02	Letter from Harold L. James, U.S. Department of the Interior, Geological Survey, to Gary H. Higgins, July 2. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-098.	Plowshare	Gold Leaching	
James, Harold L.	1968	07/09	Letter with Encl. (remarks concerning minutes of May 14 Gold Chemistry Meeting by Frank S. Grimaldi, July 2) from Harold L. James, U.S. Department of the Interior Geological Society, to Gary H. Higgins, July 9. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-098.	Plowshare	Gold Leaching	
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Joachim, Charles E.	1978	01/00	ESSEX - Diamond Ore Research Program; Tunnel Destruction A State-of-the-Art Summary. Defense Nuclear Agency, Report DNA PR 0033, U.S. Army Engineer Waterways Experiment Station, Report WES MP N-78-1, January. Washington D.C. and Vicksburg, MS. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.		ESSEX	
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Johnson, Gerald W.	1958	03/11	Paper to be presented at the A.A.P.C. Meeting, Los Angeles, CA, March. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		General

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Johnson, Gerald W.	1959	07/02	Letter from Gerald W. Johnson, Lawrence Radiation Laboratory, to Fred C. Hartley, July 2. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-105.	Plowshare	Vintage	
Johnson, Gerald W.	1959	08/21	"Ref: TWK Keto to Shute re Bureau of Mines Agreement for Vintage." Letter from Gerald W. Johnson, Lawrence Radiation Laboratory, to Russell Ball, August 21. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-105.	Plowshare	Vintage	
Johnson, Gerald W.	1959	11/18	Letter from Gerald W. Johnson, Lawrence Radiation Laboratory, to General Alfred D. Starbird, November 18. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-105.	Plowshare	Pre-Vintage	
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Johnson, Gerald W.	1960	01/19	Industrial and Scientific Applications of Nuclear Explosions. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-5840</i> , January 19. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-100.	Plowshare		Applications, Scientific Experiments, Isotopes, Neutron Resonance, Other, Earth Structure, Space
Johnson, Gerald W.	1960	02/16	Letter from Gerald W. Johnson, Lawrence Radiation Laboratory, to E. C. Shute, February 16. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900157, 7/18 and Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-105 [OUO].	Plowshare	Pinot, Pre-Vintage	
Johnson, Gerald W.	1960	03/17	Letter from Gerald W. Johnson, Lawrence Radiation Laboratory, to E. C. Shute, March 17. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900157, 7/18.	Vela Uniform	Cowboy, Plowboy	
Johnson, Gerald W.	1964	03/23	Letter from Gerald W. Johnson, Lawrence Radiation Laboratory, to Ernest Graves, March 23.	Plowshare	Zulu	

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Johnson, Gerald W.	1964	04/30	Letter from Gerald W. Johnson, Lawrence Radiation Laboratory, to Lt. Col. E. Graves, Jr., Director, April 30. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Zulu	
Johnson, Gerald W.	1964	08/12	"Plowshare Emergency Capability Program." Memo from Gerald W. Johnson, Lawrence Radiation Laboratory, to Ward Miller, August 12. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Emergency Capability Program	
Johnson, Gerald W.	1964	08/17	Letter from Gerald W. Johnson, Lawrence Radiation Laboratory, to Harvey F. Ludwig, August 17. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-100.	Plowshare	Lake Tahoe Sewage	
Johnson, Gerald W.	1964	09/08	Letter from Gerald W. Johnson, Lawrence Radiation Laboratory, to John F. Philip, September 8. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-078.	Plowshare	NAWAPA	
Johnson, Gerald W.	1964	09/08	Letter from Gerald W. Johnson, Lawrence Radiation Laboratory, to Charles M. Poll, September 8. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-078.	Plowshare	NAWAPA	
Johnson, Gerald W.	1964	11/00	Excavating with Nuclear Explosives. <i>Discover</i> , November. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-031 and PLO-103.	Plowshare		General
Johnson, Gerald W.	1965	03/05	Letter from Gerald W. Johnson, Lawrence Radiation Laboratory, to Henry H. Patton, March 5. On file at: Archives and Research, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-087.	Plowshare	Copper Recovery, Copper Flat	
Johnson, Gerald W.	1965	04/01	"The Schooner Excavation Test." Telex from Gerald W. Johnson, Lawrence Radiation Laboratory, to James E. Reeves, April 1. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-054.	Plowshare	Pre-Schooner II	
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Johnson, Gerald W.	1970	06/00	Plowshare at the Crossroads. <i>Bulletin of the Atomic Scientists</i> , pp. 83-91, June. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		General, Applications, Overview

AUTHOR	YEAR	MONTH/ DAY	TITLE AND DOCUMENT SOURCE	PROGRAM	PROJECT(S)	OTHER
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Johnson, Gerald W., and Harold Brown	1958	12/00	Non-Military Uses of Nuclear Explosives. <i>Scientific American</i> , Vol. 199, No. 6, December.	Plowshare		General
Johnson, Gerald W., and Gary H. Higgins	1964	05/19	Engineering Applications of Nuclear Explosives: Project Plowshare. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-7634</i> , May 19. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare		Applications, Mining, Aggregate, Copper, Oil, Gas Stimulation, Excavation
Johnson, Gerald W., and Gary H. Higgins	[1964]		The Use of Nuclear Explosives in Engineering and Industry. Manuscript, U.S. Atomic Energy Commission. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-031.	Plowshare		Applications, Mining, Aggregate Production, Copper Leaching, Oil, Gas, Excavation
Johnson, L. A., L. C. Marchant, and C. Q. Cupps	1975	11/00	Properties of Utah Tar Sands--North Seep Ridge Area, P.R. Spring Deposit. Report, U.S. Energy Research & Development Administration, Laramie Energy Research Center, and University of Wyoming, Laramie, WY, November. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.			Oil Sand
Johnson, L. A., L. C. Marchant, and C. Q. Cupps	1976	04/00	Properties of Utah Tar Sands--Flat Rock Mesa Area, Hill Creek Deposit. Report, U.S. Energy Research & Development Administration, Laramie Energy Research Center, and University of Wyoming, Laramie, WY, April. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.			Oil Sand

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Johnson, Stanley M.	1971	06/00	Explosive Excavation Technology. U.S. Army Engineer Nuclear Cratering Group NCG Technical Report No. 21, June. Livermore, CA.	Plowshare	Pre-Gondola, Tugboat, Trinidad	General, Applications, Explosive excavation
Johnson, Underkofler & W. W. Briggs	1965	08/00	"Owyhee County, Idaho, Project Pre-Schooner II, Ground Profile - Target Holes." Drawing No. 650816-01 from Johnson, Underkofler & W.W. Briggs, Boise, ID, August. On file at: Engineering Records Library, Nevada Test Site, Mercury, NV.	Plowshare	Pre-Schooner II	
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Johnson, W. E.	1968	05/20	Letter from W.E. Johnson, U.S. Atomic Energy Commission, to J. Williams, Governor, State of Arizona, May 20. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0075927.	Plowshare	Aquarius	

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Jones, W. Ernest	1964	06/10	Letter with Encl. (Evaluation of Nuclear Explosives in Mining an Ore Body by Underground Methods, manuscript) from W. Ernest Jones, Climax Molybdenum Company, Golden, CO, to David D. Rabb, June 10. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-086.	Plowshare	Molybdenite Recovery	
Josephwon, H. F.	1972	10/10	Memo with Encls. ("Project Diamond Ore, Montana," Special Land Use Permit and application; letter to Dante Solari, August 1) from H. F. Josephwon, Riverdale Real Estate Office, October 10. On file at: Fort Peck Archives, U.S. Army Corps of Engineers, Fort Peck, MT, Box 858.		Diamond Ore	
Justin, John	1962	11/30	Letter from John Justin, Mayor, The City of Fort Worth, Texas, to J. R. Maxfield, Jr., November 30. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-100.	Plowshare	Trinity Canal	

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Kahn, J. S.	1972	02/25	"Utilization of Slurry for Equivalence Experiments." Memo from J. S. Kahn, Lawrence Livermore Laboratory, to Col. Robert LaFrenz, February 25.		Diamond Ore	
Kahn, J. S.	1972	03/30	"Visit to Bureau of Mines, Washington, D.C., March 23, 1972." Memo from J. S. Kahn, Lawrence Livermore Laboratory, to Fred Holzer and Glenn Werth, March 30. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-087.	Plowshare	Copper Ore Chemical Mining	
Kase, K. S.	1967	06/12	"Projects Sloop and Ketch Operations Plans." Memo from K. R. Kase, Hazards Control, Off-Site Field Representative, to J. A. Button, June 12. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Ketch, Sloop	
Kavanagh, George M.	1965	05/17	Letter from George M. Kavanagh, U.S. Atomic Energy Commission, to Paul W. Ager, May 17. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Colorado River Desalinization	
Kearny, Cresson H., and Conrad V. Chester	1978	03/00	Blast Tests of Expedient Shelters in the Dice Throw Event. Oak Ridge National Laboratory, Report ORNL-5347, March. Oak Ridge, TN. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.		Dice Throw	
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Kelly, John S.	1960	10/26	Recommendations Made by the Plowshare Advisory Committee at its Meeting of October 19-20, 1960. Report from Plowshare Advisory Committee, October 26. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Ditchdigger	General, PAC

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Kelly, John S.	1963	06/24	Letter from John S. Kelly, U.S. Atomic Energy Commission, Division of Peaceful Nuclear Explosives, to Norris E. Bradbury, June 24. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-026 [OUO].	Plowshare		General
Kelly, John S.	1963	09/23	Letter from John S. Kelly, U.S. Atomic Energy Commission, Division of Peaceful Nuclear Explosives, to Roy Peterson, September 23. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare		General
Kelly, John S.	1964	09/01	"Interim Procedures for Handling Outside Contacts." Memo from John S. Kelly, U.S. Atomic Energy Commission, Division of Peaceful Nuclear Explosives, to List, September 1. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare		General, Procedures
Kelly, John S.	1965	01/05	Statement by John S. Kelly Director, Division of Peaceful Nuclear Explosives USAEC, on Plowshare Program, Before the Joint Committee on Atomic Energy, January 5, 1965. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		General, JCAE
Kelly, John S.	1965	02/16	Letter from John S. Kelly, U.S. Atomic Energy Commission, to H. G. MacPherson, February 16.	Plowshare	Magnesium Recovery	
Kelly, John S.	1966	08/05	"Outline of Proposed Plowshare Section of Annual Report to Congress for 1966." Telex from John S. Kelly, U.S. Atomic Energy Commission, to John Philip and Others, August 5. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-026.	Plowshare		General
Kelly, John S.	1966	10/28	"Another Answer to Secretary Katzenbach's Questions on Nuclear Excavation." Memo with Encl. ("Answer to Questions") from John S. Kelly, U.S. Atomic Energy Commission, Division of Peaceful Nuclear Explosives, to Multiple Recipients, October 28. On file at: Nuclear Testing Archives, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0318085.	Plowshare	Cabriolet	
Kelly, John S.	1967	01/30	Letter from John S. Kelly, U.S. Atomic Energy Commission, to Willard Bascom, January 30.	Plowshare	Miscellaneous	

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Kelly, John S.	1967	03/27	Letter with Encl. (FY 1969 Budget Assumptions, from R. P. Connell to J. S. Kelly, July 18) from John S. Kelly, U.S. Atomic Energy Commission, to Michael M. May, March 27. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900205, 19/48.	Plowshare	Cabriolet	
Kelly, John S.	1967	08/04	"Corps of Engineers' Demonstration Projects." Memo from John S. Kelly, U.S. Atomic Energy Commission, Division of Peaceful Nuclear Explosives, to James E. Reeves, August 4.	Plowshare		General, NCG
Kelly, John S.	1967	11/21	"Redirection of Plowshare Industrial Effort." Memo from John S. Kelly through General Manager, U.S. Atomic Energy Commission, to Seaborg et al., November 21. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-027.	Plowshare	Bronco, Dragon Trail, Ketch, Sloop, Wagon Wheel	General
Kelly, John S.	1968	02/26	"Work on Gold Leaching Should be Immediately Coordinated with the Bureau of Mines." Telex from John S. Kelly, U.S. Atomic Energy Commission, to Michael May, February 26. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-098.	Plowshare	Gold Leaching	
Kelly, John S.	1968	04/19	Letter with Encl. ("U.S. Atomic Energy Commission Plowshare Program Projections – Estimated Cost in Thousands and Number of Nuclear Detonations") from John S. Kelly, U.S. Atomic Energy Commission, Division of Peaceful Nuclear Explosives, to Charles C. Noble, April. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-065.	Plowshare	Galley, Gondola, Phaeton, Travois	General
Kelly, John S.	1968	04/20	"NVOO Responsibility for Project Sloop." Memo from John S. Kelly, U.S. Atomic Energy Commission, Division of Peaceful Nuclear Explosives, to James E. Reeves, April 2. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-061.	Plowshare	Sloop	
Kelly, John S.	1968	05/08	"FY 1970 Budget Assumptions for Plowshare Program." Memo with Encls. (memo to Michael M. May, May 8, Analysis of President's FY 1969 Plowshare Budget Request to Congress; and Fiscal Year 1970 Budget Assumptions for Plowshare) from John S. Kelly, U.S. Atomic Energy Commission, Division of Peaceful Nuclear Explosives, to James E. Reeves, May 8. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-026.	Plowshare		General, Budget

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Kelly, John S.	1968	09/03	Letter from John S. Kelly, U.S. Atomic Energy Commission, to Glenn C. Werth, September 3. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-065.	Plowshare	Travois	
Kelly, John S.	1968	09/04	Letter from John S. Kelly, U.S. Atomic Energy Commission, to Glenn C. Werth, September 4. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0312989.	Plowshare	Bronco, Dragon Trail	
Kelly, John S.	1968	09/30	Letter from John S. Kelly, U.S. Atomic Energy Commission, to Samuel Smith, September 30. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-032.	Plowshare	Wagon Wheel	
Kelly, John S.	1968	10/09	Telex from John S. Kelly, U.S. Atomic Energy Commission, to G. Werth, October 9. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0188175.	Plowshare	Ketch	
Kelly, John S.	1968	10/14	Letter from John S. Kelly, U.S. Atomic Energy Commission, Division of Peaceful Nuclear Explosives, to Glenn C. Werth, October 14. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-065.	Plowshare	Excavator, Travois	
Kelly, John S.	1968	12/10	Telex from John S. Kelly, Lawrence Radiation Laboratory, to Multiple Recipients, December 10. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900205, 28/48.	Plowshare	Galley, Gondola, Yawl	
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Kelly, John S.	1969	03/07	"Plowshare Capability." Letter from John S. Kelly, U.S. Atomic Energy Commission, to Robert E. Miller, March 7. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Dragon Trail	General, Admin

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Kelly, John S.	1969	04/02	"Approve the Concept for Project Yawl." Telex from John S. Kelly, U.S. Atomic Energy Commission, to Glenn Werth, April 2. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-90025, 47/48 and Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-072.	Plowshare	Yawl	
Kelly, John S.	1969	04/16	Telex from John S. Kelly, U.S. Atomic Energy Commission, to Multiple Recipients, April 16. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	North Slope Harbor	
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Kelly, John S.	1969	04/23	Telex from John S. Kelly, U.S. Atomic Energy Commission, to Robert Miller, April 23. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074 [OUO].	Plowshare	North Slope Harbor	
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Kelly, John S.	1969	08/22	Letter from John S. Kelly, Atomic Energy Commission, to Joseph J. Durek, August 22. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-087.	Plowshare	Copper Recovery	

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Kelly, John S.	1969	12/18	Letter from John S. Kelly, U.S. Atomic Energy Commission, Division of Peaceful Nuclear Explosives, to Alvin M. Weinberg, December 18. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-026.	Plowshare		General, Correspondence
Kelly, John S.	1970	01/27	"Production-Detonation Study/Miller Study." Telex from John S. Kelly, U.S. Atomic Energy Commission, to R. E. Miller, January 27. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare		General
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Kelly, John S.	1972	02/03	Statement by Mr. John S. Kelly, Assistant Director, Civilian Applications of Nuclear Explosives, Division of Applied Technology, U.S. Atomic Energy Commission for Fiscal Year 1973. Authorization Hearings by the Joint Committee on Atomic Energy, February 3. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-028. First page only.	Plowshare		General, JCAE
Kelly, John S.	1972	02/16	"Plowshare Program Funding Support." Telex from John S. Kelly, U.S. Atomic Energy Commission, to Glenn C. Werth, February 16. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-087.	Plowshare	Old Reliable Mine	

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Kelly, John S.	1972	04/10	Letter from John S. Kelly, U.S. Atomic Energy Commission, to David Swan, April 10. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-087.	Plowshare	Copper Ore Chemical Mining	
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LaFrenz, Robert L.	1971	09/07	Letter from Robert L. LaFrenz, Explosive Excavation Research Office, Corps of Engineers, to Glenn Werth, September 7. On file at Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.		Diamond Ore	

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LaFrenz, Robert L.	1972	04/10	"Status Report - Rapid Excavation with Explosives." Letter with Encl. ("Status Report, Effective Date: 31 March 1972") from Robert L. LaFrenz, Explosive Excavation Research Office, Corps of Engineers, to Director, U.S. Army Engineer Waterways Experiment Station, April 10. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-108.	Plowshare	Diamond Ore, Kaalualu Bay Harbor, Libby, Lost Creek, Mini Ore, Sergius Narrows, Trencher, Trinidad, Tugboat	General, EERO
LaFrenze, Robert L., and Walter C. Day	1972	00/00	Explosive Excavation Development for Construction and Combat Applications. U.S. Army Engineer Waterways Experiment Station Explosive Excavation Research Office, AD750344. Livermore, CA.	Plowshare	Drum Inlet, Libby, Trinidad, Tugboat, Pre-Gondola	General, EERO
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Larson, Max	1969	12/09	Letter from Max Larson to D. F. Snoeberger and J. S. Kahn, December 9. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-098.	Plowshare	Gold Leaching	
Las Vegas paper	1966	09/07	A-Blast on Road Project Shelved. Las Vegas paper, September 7. Las Vegas, NV.	Plowshare	Carryall	
Las Vegas Review Journal	1964	12/27	Plowshare Projects: Nuclear Power for Excavation. <i>Las Vegas Review Journal</i> , December 27. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900208 4/48.	Plowshare		General
Las Vegas Review Journal	1968	12/12	Used as 'Guinea Pigs': A-Blasts Endanger West: Prof. <i>Las Vegas Review Journal</i> , December 12. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare		General
Las Vegas Review Journal	1968	12/18	Ban the Bomb. <i>Las Vegas Review Journal</i> , December 18.	Plowshare		General
Lattery, J. E., editor	1971	03/00	Project Pre-Gondola III, Phase II, Summary Report: Connecting Row-Crater Experiment. Lawrence Radiation Laboratory, U.S. Army Engineer Nuclear Cratering Group, Report PNE 1117, March. Livermore, CA. On file at: Technical Library, National Nuclear Security Administration, Las Vegas, NV.	Plowshare	Pre-Gondola	
Lattery, J. E.	1974	01/00	Project Trinidad: Explosive Excavation of Railroad Cuts 2 and 3 by Mounding and Directed Blasting. U.S. Army Engineer Waterways Experiment Station, Explosive Excavation Research Laboratory, Technical Report No. E-74-1, January. Livermore, CA. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Trinidad	
Lawrence Livermore Laboratory			Pricing the Gas Stimulation Explosive. Manuscript, no date. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare		General, Cost

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Lawrence Livermore Laboratory			"Artists Concept of Waste Disposal in a Typical Nuclear Chimney." Drawing from Lawrence Livermore Laboratory, no date. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Radioactive Waste	
Lawrence Livermore Laboratory	1971	09/30	Status of EERO Technical Reports for First Quarter FY 1972. U.S. Army Engineer Explosive Excavation Research Office, Livermore, CA, September 30. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-108.	Plowshare		General, EERO
Lawrence Livermore Laboratory	1971	11/05	Press Release, Subject: Radioactive waste disposal. From Lawrence Livermore Laboratory, November 5. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Radioactive Waste	
Lawrence Livermore Laboratory	1972	02/17	Nuclear Gas Stimulation Development Program Planning Document. Manuscript, Lawrence Livermore Laboratory, Division of Applied Technology, February 17. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-028.	Plowshare		Application, Gas
Lawrence Livermore Laboratory	1972	03/16	"Peaceful Uses of Nuclear Explosives." Table, March 16. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-028 and PLO-031.	Plowshare		General
Lawrence Livermore Laboratory	1972	11/23	Press Release, Subject: Scientists at Lawrence Livermore Laboratory will attend the Third Panel on Peaceful Nuclear Explosives in Vienna, Austria. From Lawrence Livermore Laboratory, November 23. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-028.	Plowshare		General, IAEA
Lawrence Livermore Laboratory	1974		Energy and Resource Program Annual Report for 1974. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Copper Ore Chemical Mining	General, Applications, Gas Stimulation, Oil Shale, Chemical Mining
Lawrence Livermore Laboratory	1974	08/12	"Management Plan - Coal Gasification Project." Management Plan, August 12. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.			General, Admin
Lawrence Livermore Laboratory	1976	04/16	Summary Table, FY 1978 Budget Planning Estimates, Nuclear Explosive Applications. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	NEA		General, NEA

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Lawrence Livermore Laboratory	1977	01/13	Recent Developments in the NEA Project. Lawrence Livermore Laboratory, K-Division Meeting, January 13, 1977. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	NEA		General, NEA
Lawrence Livermore Laboratory	[1977]		Proposed Five-Year Nuclear Explosive Application (NEA) Program. Manuscript, Lawrence Livermore National Laboratory. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	NEA		General, NEA
Lawrence Livermore Laboratory	[1977]		"Have Outlined a Program Which..." Notes and Figures for NEA Program. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	NEA		General, NEA
Lawrence Livermore National Laboratory			"Areas of U.S. Copper Reserves." Map and drawing. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-0884.	Plowshare	Copper Recovery	General, Graphic
Lawrence Livermore National Laboratory			Australia Boab tree photo 29. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		Photo
Lawrence Livermore National Laboratory			Australia, Dampier Dock western Australia photo. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		Photo
Lawrence Livermore National Laboratory			Australia, Diamond Gorge 21 photo. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		Photo
Lawrence Livermore National Laboratory			Australia map. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			Australia, termite mound photo. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic

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Lawrence Livermore National Laboratory			Australia, Western Australia harbor photo. Negative No. GLC-691-581. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			Bronco-b photo. Negative No. GLC-674-2752. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Bronco	General, Graphic
Lawrence Livermore National Laboratory			Bronco-c photo. Negative No. GLC-674-2753. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Bronco	General, Graphic
Lawrence Livermore National Laboratory			Bronco-d photo. Negative No. 67J6 630. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Bronco	General, Graphic
Lawrence Livermore National Laboratory			Buggy photo -05-A. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Buggy	General, Graphic
Lawrence Livermore National Laboratory			"Cape Keraudren Harbor Concept." Cape Keraudren harbor concept drawing. Negative No. GLC-695-3283. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cape Keraudren	General, Graphic
Lawrence Livermore National Laboratory			Cape Keraudren map. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cape Keraudren	General, Graphic
Lawrence Livermore National Laboratory			Cape Keraudren photo. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cape Keraudren	General, Graphic
Lawrence Livermore National Laboratory			Cape Keraudren 40 photo. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cape Keraudren	General, Graphic

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Lawrence Livermore National Laboratory			Cape Reston Harbor Site 42 photo. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cape Reston	General, Graphic
Lawrence Livermore National Laboratory			Cape Reston Harbor Site 43 photo. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cape Reston	General, Graphic
Lawrence Livermore National Laboratory			Carryall-b model. "Carryall Feasibility Study" Carryall-b1 text. Negative No. GLB-6312-7051. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Carryall	General, Graphic
Lawrence Livermore National Laboratory			Carryall-c drawing. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Carryall	General, Graphic
Lawrence Livermore National Laboratory			Carryall-d area photo. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Carryall	General, Graphic
Lawrence Livermore National Laboratory			Carryall-f drawing. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Carryall	General, Graphic
Lawrence Livermore National Laboratory			Carryall rad map, c1188. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Carryall	General, Graphic
Lawrence Livermore National Laboratory			"Cavity and Fracture Formation." Drawing, P31_4. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"Cavity-Chimney Formation History." Cavity chimney formation drawing - 05-A. Negative No. GLC-6811-7047. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic

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Lawrence Livermore National Laboratory			Chariot crater photo. On file at: Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Chariot	General, Graphic
Lawrence Livermore National Laboratory			Chariot huts photo. On file at: Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Chariot	General, Graphic
Lawrence Livermore National Laboratory			"Chariot Experimental Schematic Layout." Chariot schematic layout drawing. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Chariot	General, Graphic
Lawrence Livermore National Laboratory			"Chemical Mining Flooded Primary Sulfide Ore." Chemical mining drawing. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-0883.	Plowshare	Copper Ore Chemical Mining	General, Graphic
Lawrence Livermore National Laboratory			Cold environment harbor drawing -05-B1. Negative No. GLC-697-4013. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	North Slope Harbor	General, Graphic
Lawrence Livermore National Laboratory			"Collapse Crater Concept." Collapse crater concept drawing. Negative No. GLC-6812-8067. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"Commercial Fielding Concept." Gas stimulation drawing -05-A1. Negative No. GLC-721-331. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"Conceptual Drawing of Nuclear-Excavated Channel." Nuclear-excavated canal drawing. PNE-50101. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			Cowboy_1a photos. Photos No. CO-283 and CO-284. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cowboy	General, Graphic

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Lawrence Livermore National Laboratory			Cowboy_1b AEC office photos. Photos No. CO-287 and CO-288. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cowboy	General, Graphic
Lawrence Livermore National Laboratory			Cowboy_1c Carey Salt Mine photos. Photos No. CO-267 and CO-268. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cowboy	General, Graphic
Lawrence Livermore National Laboratory			Cowboy_1c1 Carey Salt Mine photo. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cowboy	General, Graphic
Lawrence Livermore National Laboratory			Cowboy_1d photos. Photos No. CO-195 and CO-196. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cowboy	General, Graphic
Lawrence Livermore National Laboratory			Cowboy_1d1 photo. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cowboy	General, Graphic
Lawrence Livermore National Laboratory			Cowboy_1e photo. Photos No. CO-197 and CO-198. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cowboy	General, Graphic
Lawrence Livermore National Laboratory			Cowboy_1e1 photo. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cowboy	General, Graphic
Lawrence Livermore National Laboratory			Cowboy_1f photo. Photo No. CO-168. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cowboy	General, Graphic
Lawrence Livermore National Laboratory			Cowboy_1g1 photo. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cowboy	General, Graphic

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Lawrence Livermore National Laboratory			Cowboy_1g photo. Photos No. CO-395 and CO-396. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cowboy	General, Graphic
Lawrence Livermore National Laboratory			Cowboy_1h photo. Photos No. CO-409 and CO-410. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cowboy	General, Graphic
Lawrence Livermore National Laboratory			Cowboy_2a photo. Photos No. CO-667 and CO-668. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cowboy	General, Graphic
Lawrence Livermore National Laboratory			Cowboy_2b photo. Photos No. CO-669 and CO-670. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cowboy	General, Graphic
Lawrence Livermore National Laboratory			"Crater Formation History." Crater formation drawing -05-A1. Negative No. GLC-683-2350. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"Crater Lip Dam." Crater lip dam-a drawing. Negative No. GLC-688-5750. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"Crater Lip Dam USSR Project "1004"." USSR dam photo -05-B. Negative No. GLC-712-802. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"Cross Section Through the Safford Low Grade Copper Deposit (Section Y-Y)." Safford copper deposit drawing. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-0882.	Plowshare	Sloop	General, Graphic
Lawrence Livermore National Laboratory			Deepdale Iron Ore Broken Hill 41 photo. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic

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Lawrence Livermore National Laboratory			Dragon Trail photo, dt-a. Negative No. 67J 627. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Dragon Trail	General, Graphic
Lawrence Livermore National Laboratory			Dragon Trail photo, dt-b. Negative No. 67J 637. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Dragon Trail	General, Graphic
Lawrence Livermore National Laboratory			Dragon Trail photo, dt-c. Negative No. 67J 628. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Dragon Trail	General, Graphic
Lawrence Livermore National Laboratory			"Drainage Diversion and Interception." Drainage diversion drawing. Negative No. GLB-6312-6444A. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-103.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"Effects of Depth on Nuclear Explosion Phenomena." Explosive excavation drawing -05-A1. Negative No. GLC-695-3033. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"Effects of Medium Cratering." Effects medium cratering drawing, talk 8. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"Effects of Medium Rock Mechanics." Effects of medium drawing, P31_3. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			Elat_a canal map. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"Excavation Explosive in a Typical Operational Environment." Explosive excavation schematic drawing. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic

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Lawrence Livermore National Laboratory			"Flooded Chimney Experiment." Flooded chimney drawing chim_a. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			Gasbuggy photo -05-A1. Negative No. GLC-6711-862. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Gasbuggy	General, Graphic
Lawrence Livermore National Laboratory			"Gas/LNG Storage in Multiple Offshore Geonuclear Chimneys." Offshore geonuclear chimneys drawing. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-096.	Plowshare	Atlantic Gas Storage	General, Graphic
Lawrence Livermore National Laboratory			"Gas Reservoir Stimulation." Gas reservoir stimulation drawing. Negative No. GLC-665-3757. D987On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-26-2.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"Geologic Cross Section Through Area of Hole 1004 After Explosion." USSR crater lip dam drawing -05-C1. Negative No. GLC-705-5. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"Green River Basin-Wyoming." Green River basin map_05_a. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Wagon Wheel	General, Graphic
Lawrence Livermore National Laboratory			Handcar text_05_a1. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Handcar	General, Graphic
Lawrence Livermore National Laboratory			"Harbor Concept." Generic harbor concept drawing. Negative No. GLC-695-3284. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"Harbor Excavation." Excavation drawing, harbor-a. Negative No. GLC-6610-9007. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Katalla Harbor	General, Graphic

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Lawrence Livermore National Laboratory			Hard Hat 1 drawing. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-29.	Plowshare	Hard Hat	General, Graphic
Lawrence Livermore National Laboratory			"In-Situ Coal Gasification Concept." In situ coal gasification drawing. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"In-Situ Ore Leaching." In situ ore leaching drawing. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO26-1.	Plowshare	Copper Recovery	General, Graphic
Lawrence Livermore National Laboratory			"In-Situ Retorting-Oil Shale." Oil shale drawing, retort_b. Negative No. GLC-665-3753. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Utah	General, Graphic
Lawrence Livermore National Laboratory			"Integrated Control System." Plowshare control system drawing -05-A1. Negative No. GLC-697-3991. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"Iron Ore Developments in Northwestern Australia." Northwest Australia ore bodies map. Negative No. GLC-695-3282. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"James Bay Development." James Bay development map. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"LLL Photograph." LLL_scientists photo. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"Low Permeability Basins of the Rocky Mountain States." Gas stimulation projects site map_05_a. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic

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Lawrence Livermore National Laboratory			Lunar_a base drawing and Lunar_a1 "The Lunar Base" text. Negative No. 12189. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Lunar	General, Graphic
Lawrence Livermore National Laboratory			Lunar_b fuel factory drawing and Lunar_b1 "Nuclear Powered Lunar Fuel Factory" text. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Lunar	General, Graphic
Lawrence Livermore National Laboratory			"Major Basins Rocky Mountain States." Gas stimulation project site map_05_b. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"Map of Alaska - Chariot Location." Chariot_a Alaska map. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Chariot	General, Graphic
Lawrence Livermore National Laboratory			Mars A base drawing and Mars A1 "Mars Base" text. Negative No. 12189MARS. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Mars	General, Graphic
Lawrence Livermore National Laboratory			Mineral Lode aerial photo 1 beck 1. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Mineral Lode	General, Graphic
Lawrence Livermore National Laboratory			Mineral Lode aerial photo 2 beck 2. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Mineral Lode	General, Graphic
Lawrence Livermore National Laboratory			Mineral Lode photo 1 beck 3. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Mineral Lode	General, Graphic
Lawrence Livermore National Laboratory			Mineral Lode photo 2 beck 4. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Mineral Lode	General, Graphic

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Lawrence Livermore National Laboratory			Mineral Lode photo 3 beck 5. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Mineral Lode	General, Graphic
Lawrence Livermore National Laboratory			Miniata photo_05_b. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Miniata	General, Graphic
Lawrence Livermore National Laboratory			Miniata photo_05_c. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Miniata	General, Graphic
Lawrence Livermore National Laboratory			Miniata photo_05_d. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Miniata	General, Graphic
Lawrence Livermore National Laboratory			Miniata photo_05_e. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Miniata	General, Graphic
Lawrence Livermore National Laboratory			Miniata planning session photo_05_a. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Miniata	General, Graphic
Lawrence Livermore National Laboratory			MR sampler photo_05_a. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Miniata	General, Graphic
Lawrence Livermore National Laboratory			Mt. Goldsworthy photo. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"Nuclear Bulk Dam." Nuclear bulk dam_c drawing. Negative No. GLC-683-2152. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic

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Lawrence Livermore National Laboratory			"Nuclear Ejecta Dam." Nuclear ejecta dam_b drawing. Negative No. GLC-683-2152A. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Bruneau Canyon Dam, Excavator	General, Graphic
Lawrence Livermore National Laboratory			"Nuclear Excavated Canal." Nuclear excavated canal drawing, pcanal_b. Negative No. GLC-692-858. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"Nuclear Explosion in Oil Shale." Oil shale chimneys drawing, oshale_a. Negative No. GLC-712-871A. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Utah	General, Graphic
Lawrence Livermore National Laboratory			"Nuclear Gas Reservoir Stimulation." Nuclear gas reservoir drawing, gas_b. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Wagon Wheel	General, Graphic
Lawrence Livermore National Laboratory			"Nuclear Harbor Cape Keraudren, Western Australia." Nuclear harbor Cape Keraudren drawing, talk 4. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cape Keraudren	General, Graphic
Lawrence Livermore National Laboratory			"Nuclear Harbor Concept." Harbor concept drawing_05-a1. Negative No. GLC-6812-7777A. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"Nuclear Quarry." Nuclear quarry-a drawing. Negative No. GLC-683-2151. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Excavator	General, Graphic
Lawrence Livermore National Laboratory			"Nuclear Reservoir for Flood Control and Irrigation." Nuclear reservoir concept drawing. Negative No. GLC-682-1807. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"Offshore Storage & Production System." Offshore storage drawing_05_a. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Atlantic Gas Storage, Undersea Fuel Oil Storage	General, Graphic

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Lawrence Livermore National Laboratory			One Loading Facility 47 photo. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			Onslow 22 photo. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			Pelletizing Plant 48 photo. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"Perspective and Section of Sea Level Canal." Sea level canal drawing, pcanal_c. Negative No. K-2000-116. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			Plowshare analysis photo_05_b. Negative No. GLC-692-691. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			Plowshare gas samples photo_05_a. Negative No. GLC-692-982. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			Plowshare instrumentation photo_05_d. Photograph No. N-29323. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			Plowshare locations map_05_a. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			Plowshare swords text. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic

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Lawrence Livermore National Laboratory			Plowshare swords 2 drawing. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			Port Heland 35 photo. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			Port Heland 36 photo. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"Power From Geothermal Heat." Geothermal heat drawing, geotherm_a. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			Prebuggy aerial photo_05_a. Negative No. GLB-639-5176. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Pre-Buggy	General, Graphic
Lawrence Livermore National Laboratory			Prebuggy aerial photo_05_b. Negative No. GLB-644-1171. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Pre-Buggy	General, Graphic
Lawrence Livermore National Laboratory			Pre-Buggy HE photo. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA. File PLO-109.	Plowshare	Pre-Buggy	General, Graphic
Lawrence Livermore National Laboratory			Pre-Gondola, Trencher area photo. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-109.2.	Plowshare	Pre-Gondola, Trencher	General, Graphic
Lawrence Livermore National Laboratory			Pre-Gondola photo pg_9. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Pre-Gondola	General, Graphic

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Lawrence Livermore National Laboratory			"Pressure Vessel For Experimental Leaching of Primary Sulfide Ore." Pressure vessel drawing_05_a. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Copper Ore Chemical Mining	General, Graphic
Lawrence Livermore National Laboratory			"Presumed PNE Sites in Soviet Union (1965-1977)." PNE sites map, Russia 1. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"Project Bronco - Explosion Effects." Explosion effects drawing, Bronco-a. Negative No. GLC 6810-6453. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Bronco	General, Graphic
Lawrence Livermore National Laboratory			"Project Carryall - Bristol Mountain." Carryall map/drawing-05-A, A1. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Carryall	General, Graphic
Lawrence Livermore National Laboratory			"Project Carryall Study Limits." Carryall-a map. Negative No. GLB-6312-7051. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Carryall	Map
Lawrence Livermore National Laboratory			"Project Dragon Trail." Dragon Trail drawing. Negative No. GLC-6811-7459+D954. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Dragon Trail	General, Graphic
Lawrence Livermore National Laboratory			Proposed Alaska harbor location map -05-A. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cape Darby, Chariot	General, Graphic
Lawrence Livermore National Laboratory			Proposed Alaska harbor location map -05-B. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cape Darby, Chariot	General, Graphic
Lawrence Livermore National Laboratory			Proposed Alaska harbor location map -05-C. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cape Darby, Chariot	General, Graphic

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Lawrence Livermore National Laboratory			Proposed Alaska harbor location map -05-D. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cape Darby, Chariot	General, Graphic
Lawrence Livermore National Laboratory			Proposed Alaska harbor location map -05-E. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cape Darby, Chariot	General, Graphic
Lawrence Livermore National Laboratory			Proposed Alaska harbor location map -05-F. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cape Darby, Chariot	General, Graphic
Lawrence Livermore National Laboratory			Proposed Alaska harbor location map -05-G. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cape Darby, Chariot	General, Graphic
Lawrence Livermore National Laboratory			Proposed Alaska harbor location map -05-H. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cape Darby, Chariot	General, Graphic
Lawrence Livermore National Laboratory			"Retarc Formation History." Retarc formation drawing_05_a. Negative No. GLC-683-2351. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"Retars for In-Situ Leaching." Retars in situ leaching drawing. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-0881.	Plowshare	Copper Recovery	General, Graphic
Lawrence Livermore National Laboratory			Retort_a photo. Negative No. GLB-666-4764. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Utah	General, Graphic
Lawrence Livermore National Laboratory			Rio Blanco aerial photo_05_a. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Rio Blanco	General, Graphic

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Lawrence Livermore National Laboratory			Rio Blanco fallout map/drawing c. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Rio Blanco	General, Graphic
Lawrence Livermore National Laboratory			Rio Blanco site plan drawing_05_b. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Rio Blanco	General, Graphic
Lawrence Livermore National Laboratory			"Row Charge Excavation." Row charge excavation drawing. Negative No. GLC-6910-5973. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			Russia_a group photo. Negative No. ARC-100121-4. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			Russia_b group photo. Negative No. GLB-702-906. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"Russian Large Explosions for Excavation Purposes." Soviet HE tests map, UCRL-5917. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-1032.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"Salmon - Post Explosion Environment." Salmon-post explosion drawing, P31-1. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Salmon	General, Graphic
Lawrence Livermore National Laboratory			Schooner photo_05_a. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Schooner NTS	General, Graphic
Lawrence Livermore National Laboratory			Sedan aerial photo_05_b2. From Geologic Resume of the Sedan and Dannyboy Nuclear Craters, W. D. Richards and J. F. Leisek. Paper to be presented at the Plowshare Advisory Committee Meeting, October 28, 1963, Livermore, CA. On file	Plowshare	Sedan	General, Graphic

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Lawrence Livermore National Laboratory			Sedan and Dannyboy aerial photo/drawing_05_b1. From Geologic Resume of the Sedan and Dannyboy Nuclear Craters, W. D. Richards and J. F. Leisek. Paper to be presented at the Plowshare Advisory Committee Meeting, October 28, 1963, Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Sedan, Dannyboy	General, Graphic
Lawrence Livermore National Laboratory			Sedan photo_05_a. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Sedan	General, Graphic
Lawrence Livermore National Laboratory			Sedan 1 photo, P29. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Sedan	General, Graphic
Lawrence Livermore National Laboratory			Sedan 2 photo, P29. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Sedan	General, Graphic
Lawrence Livermore National Laboratory			"Simplified Field Operation." Plowshare field operations concept drawing_05_c. Negative No. GLC-684-3384. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"Site Layout Project Oilsand." Oilsand drawing_05_a and text_05_a1. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Oilsand	General, Graphic
Lawrence Livermore National Laboratory			Spiridon Lake map_05_a, b, c, d. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Spiridon Lake	General, Graphic
Lawrence Livermore National Laboratory			Store front town near Chariot photo. On file at: Archives and Records Center, Lawrence Livermore National Laboratory, Livermore, CA,	Plowshare	Chariot	General, Graphic
Lawrence Livermore National Laboratory			"Streamlined Operational System Concept." Plowshare operational concept drawing. Negative No. GLC-677-4788. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic

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Lawrence Livermore National Laboratory			Tatum_a dome photos. Photos No. CO-671 and CO-672. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			Tatum_b dome photos. Photos No. CO-673 and CO-674. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			Tatum_c dome photos. Photos No. CO-675 and CO-676. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"Terminal Gas Storage." Terminal gas storage drawing. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-26-3.	Plowshare	Ketch	General, Graphic
Lawrence Livermore National Laboratory			"The Darien Gap." Darien gap canal routes map, P31-5. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"The Plowshare Program." Plowshare program organization drawing. Negative No. GLC-688-5367. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"Trans Isthmian Canal Routes." Trans Isthmian map, pcanal_a. Negative No. GLC-642-1469. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			Trencher photo pg_b. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Trencher	General, Graphic
Lawrence Livermore National Laboratory			Trencher photo pg_c. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Trencher	General, Graphic

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Lawrence Livermore National Laboratory			Trencher photo pg_d. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Trencher	General, Graphic
Lawrence Livermore National Laboratory			Trencher photo pg_e. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Trencher	General, Graphic
Lawrence Livermore National Laboratory			TTR1 mining location (?) photo. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-087.	Plowshare	TTR	General, Graphic
Lawrence Livermore National Laboratory			TTR2 mining location (?) photo. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-087.	Plowshare	TTR	General, Graphic
Lawrence Livermore National Laboratory			"Undersea Oil Storage Concepts." Undersea storage drawing_05_a. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Undersea Fuel Oil Storage	General, Graphic
Lawrence Livermore National Laboratory			USSR_b dam photo. Negative No. GLB-704-2210. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			USSR_c photos. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			"USSR High Explosive Ejecta Dam on Vakhsh River." USSR_a ejecta dam photo. Negative No. GLB-688-5238. Reprinted from <i>Engineering News-Record</i> , May 30, 1968. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory			USSR map Pechora River GL...1 7580A. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic

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Lawrence Livermore National Laboratory			USSR north-south canal map, P31-4. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Graphic
Lawrence Livermore National Laboratory	1964	05/06	Status of Plowshare Field Programs. Report from Lawrence Livermore National Laboratory, May 6. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Carryall, Dogsled, Galley, Hansom, Pre-Schooner II	General
Lawrence Livermore National Laboratory	1966	02/01	Status Report, Plowshare Program. University of California, Lawrence Livermore National Laboratory, <i>Report UCRL-ID-126143</i> , February 1. Livermore, CA.	Plowshare	Carryall, Copper Recovery, Galley, Windsor	General
Lawrence Livermore National Laboratory	1982	09/00	Project Plowshare: A Brief History. <i>Energy and Technology Review</i> , pp. 13-20, September. Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Bronco, Copper Ore Chemical Mining	General
Lawrence Radiation Laboratory			Outline of Procedures and Responsibilities to Initiate a Plowshare Project. Manuscript. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		General, Procedures
Lawrence Radiation Laboratory	1958	12/24	Operational Concept of the Technical Director for Katalla Harbor. Manuscript, Lawrence Radiation Laboratory, December 24. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV and Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900157, 2/18 [OUO].	Plowshare	Katalla Harbor	
Lawrence Radiation Laboratory	1960	08/03	"Purchase Order Agreement 6731407, Nat Whiton, Honolulu, HI." Letter from Lawrence Radiation Laboratory to E. C. Shute, August 3. On file at: Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900157, 7/18.	Plowshare	Iki	
Lawrence Radiation Laboratory	1960	09/28	The Wagon Experiment: A Nuclear Cratering/Radioactivity Experiment in Basalt. Manuscript. September 28. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900157, 7/18; and Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-066.	Plowshare	Wagon	

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Lawrence Radiation Laboratory	1960	10/26	Letter from Lawrence Radiation Laboratory to E. C. Shute, October 26. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900157, 7/18.	Plowshare	Wagon	
Lawrence Radiation Laboratory	1960	11/04	Project Dribble, AEC Program Concept, 4 November 1960. Manuscript, Lawrence Radiation Laboratory, Livermore, CA, November 4. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Vela Uniform	Cowboy, Dribble	
Lawrence Radiation Laboratory	1961	01/30	Architect-Engineer's Scope of Work, Technical Program Construction, Project Wagon. Manuscript, January 30. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV [OUO].	Plowshare	Wagon	
Lawrence Radiation Laboratory	1961	07/24	Technical Director's Operation Plan - Project Gnome. Manuscript, Lawrence Radiation Laboratory, July 24. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0015505.	Plowshare	Gnome, Pre-Gnome	
Lawrence Radiation Laboratory	1962	09/10	LRL Technical Concept, Project Dribble, September 10, 1962. Manuscript, Lawrence Radiation Laboratory, September 10. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-013.	Vela Uniform	Dribble, Sand, Tar, Ripple	
Lawrence Radiation Laboratory	1963	03/13	"Appendix A to Purchase Order 6176305." Appendix to Purchase Order between Lawrence Radiation Laboratory and Anaconda Company, March 13. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-102.	Plowshare	Copper Recovery, Zinc Recovery	
Lawrence Radiation Laboratory	1963	10/00	"Plowshare Division." Document, October. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, Box 422, File 4073.	Plowshare		General, Biographic
Lawrence Radiation Laboratory	1963	12/30	Memo from Lawrence Radiation Laboratory, K-Division, to Distribution, January 3. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-102.	Plowshare	Copper Recovery, Zinc Recovery	
Lawrence Radiation Laboratory	[1963]		The Use of Nuclear Explosives for the Production of Aggregate for the San Luis Dam. Manuscript, Lawrence Radiation Laboratory, ca. 1963, Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-084.	Plowshare	San Luis Dam	

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Lawrence Radiation Laboratory	1964	01/00	Symposium on Nuclear Excavation Abridgments. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-7632</i> , January. Livermore, CA. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV; and Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-026.	Plowshare		Application, Excavation
Lawrence Radiation Laboratory	1964	02/24	"Unclassified TWX MA:358-1, Betts to Reeves, Info R. E. Batzel, dated 12/24/63." Letter from Lawrence Radiation Laboratory to Brigadier General Delmar Crowson, February 24. On file at: Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900205, 5/48.	Vela Uniform	Dribble, Sand, Tar, Salmon	
Lawrence Radiation Laboratory	1964	04/21	Proceedings of the Third Plowshare Symposium: Engineering with Nuclear Explosives, University of California, Lawrence Radiation Laboratory, April 21, 22, 23. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare		General, Symposium
Lawrence Radiation Laboratory	1964	07/00	Technical Director's Operations Plan, Project Dribble, Salmon Event, July 1964. Manuscript, Lawrence Radiation Laboratory, Livermore, CA.	Vela Uniform	Dribble, Salmon, Sand, Tar	
Lawrence Radiation Laboratory	1964	12/00	Plowshare Program, October - December 1964, Vol. I, No. 2. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-14298</i> . Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare		General, Quarterly
Lawrence Radiation Laboratory	1965		Nuclear Cratering: Experience, Problems, Programs. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0184661.	Plowshare	Pre-Schooner II, Galley, various	
Lawrence Radiation Laboratory	1965	03/00	Plowshare Program, January - March 1965, Vol. I, No. 3. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-14299</i> . Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare		General, Quarterly
Lawrence Radiation Laboratory	1965	03/30	UCRL Reports Index. Revised March 30, 1965. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-026.	Plowshare		General, Reference
Lawrence Radiation Laboratory	1965	06/00	Plowshare Program, April - June 1965, Vol. I, No. 4. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-14340</i> . Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare		General, Quarterly

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Lawrence Radiation Laboratory	1965	11/01	University of California Lawrence Radiation Laboratory Appendix B to Purchase Order 4711703 with Mathematica, Inc, November 1. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900205, 16/48.	Plowshare		General, Purchase Order
Lawrence Radiation Laboratory	1965	12/16	Costs and Time Variations in Construction of Large Underground Cavities. Manuscript, Lawrence Radiation Laboratory, December 16, Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-031.	Vela Uniform	Payette	
Lawrence Radiation Laboratory	1965	12/17	University of California Lawrence Radiation Laboratory Terms and Conditions of Purchase Order 4711703 with Mathematica, Inc. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900205, 16/48.	Plowshare		General, Purchase Order
Lawrence Radiation Laboratory	1965	12/22	Plowshare Program, July - September 1965, Vol. III, No. 1. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-14542</i> , December 22. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare		General, Quarterly
Lawrence Radiation Laboratory	1968		FY 1969, Plowshare Program Plan #6. Budget from U.S. Atomic Energy Commission. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900205, 28/48.	Plowshare	Dragon Trail	
Lawrence Radiation Laboratory	1968	06/06	Technical Concept, Project Travois Aggregate Production Experiment. Manuscript, June 6. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-065 [OUO].	Plowshare	Excavator, Travois	
Lawrence Radiation Laboratory	1968	06/27	"Background Discussion Paper for 27 June 1968 Travois Meeting." Manuscript, Lawrence Radiation Laboratory, June 27. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-065 [OUO].	Plowshare	Excavator, Travois	
Lawrence Radiation Laboratory	1968	06/27	"Proposed Agenda Topics – Travois Meeting, 27 June 1968, Summary of Scientific and Technical Programs and Time Estimates for Project Travois." Agenda for Travois Meeting, Nevada Operations Office, June 27. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-065.	Plowshare	Excavator, Travois	
Lawrence Radiation Laboratory	1968	07/22	"Dragon Trail - Hi-Pressure Closed Cycle Drilling System Flow Diagram." Drawing No. 68-113954 from Lawrence Radiation Laboratory, July 22. On file at: Engineering Records Library, Nevada Test Site, Mercury, NV, Index No. 044407.	Plowshare	Dragon Trail	

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Lawrence Radiation Laboratory	1970	08/10	Concept of a Proposed Chemical Mining Experiment at Copper Creek, Arizona. Manuscript, Lawrence Radiation Laboratory, Livermore, CA, August 10. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-087.	Plowshare	Newmont, Copper Ore Chemical Mining	
Lawrence Radiation Laboratory and U.S. Army Corps of Engineers	[1962]		Letter of Understanding between the Lawrence Radiation Laboratory and U.S. Army Corps of Engineers. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		General, Procedures
Lawrence Radiation Laboratory and U.S. Atomic Energy Commission, San Francisco Operations Office	1959	05/15	Proceedings of the Second Plowshare Symposium: Part I - Phenomenology of Underground Explosions. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-5675</i> , May 15. Livermore, CA. On file at: Archive and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, Misc. Document. Introduction and Table of Contents only.	Plowshare		Phenomenology
Lawrence Radiation Laboratory and U.S. Atomic Energy Commission, San Francisco Operations Office	1959	05/15	Proceedings of the Second Plowshare Symposium: Part II - Excavation. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-5676</i> , May 15. Livermore, CA. On file at: Archive and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-027. incomplete document.	Plowshare		Applications, Excavation
Lawrence Radiation Laboratory and U.S. Atomic Energy Commission, San Francisco Operations Office	1959	05/15	Proceedings of the Second Plowshare Symposium: Part III - The Recovery of Power and Isotopes from Contained Underground Nuclear Explosions. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-5677</i> , May 15. Livermore, CA. On file at: Archives and Research Center Lawrence Livermore National Laboratory, Livermore, CA. Incomplete document.	Plowshare		Applications

AUTHOR	YEAR	MONTH/ DAY	TITLE AND DOCUMENT SOURCE	PROGRAM	PROJECT(S)	OTHER
Lawrence Radiation Laboratory and U.S. Atomic Energy Commission, San Francisco Operations Office	1959	05/15	Proceedings of the Second Plowshare Symposium: Part IV - Water Resources, Mining, Chemicals, Petroleum. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-5678</i> , May 15. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-027. Incomplete document.	Plowshare		Applications
Lawrence Radiation Laboratory and U.S. Atomic Energy Commission, San Francisco Operations Office	1959	05/15	Proceedings of the Second Plowshare Symposium: Part V - Scientific Uses of Nuclear Explosions. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-5679</i> , May 15. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA. Incomplete document.	Plowshare		Scientific
Lawrence Radiation Laboratory. U.S. Army Engineer Nuclear Cratering Group			Description of Craters: Nevada Test Site. Manuscript. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-092.			Phenomenology Craters
Lawrence Radiation Laboratory. U.S. Army Engineer Nuclear Cratering Group			Thoughts on AEC Mission. Manuscript. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		General, NCG

AUTHOR	YEAR	MONTH/ DAY	TITLE AND DOCUMENT SOURCE	PROGRAM	PROJECT(S)	OTHER
Lawrence Radiation Laboratory. U.S. Army Engineer Nuclear Cratering Group	1963	06/28	Chart of Accounts - Project Schooner. Table, June 28. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900157, 18/18.	Plowshare	Schooner NTS	
Lawrence Radiation Laboratory. U.S. Army Engineer Nuclear Cratering Group	[1964]		Preliminary Proposal: Project Steamboat. Manuscript. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-062.	Plowshare(?)	Steamboat	
Lawrence Radiation Laboratory. U.S. Army Engineer Nuclear Cratering Group	[1964]		Proposed Outline for Manual on The Use of Nuclear Explosives for Military Engineering Purposes. Manuscript. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		General, NCG
Lawrence Radiation Laboratory. U.S. Army Engineer Nuclear Cratering Group	1966	08/27	Plan for Accomplishment of a Demonstration of the Application of Nuclear Excavation in Civil Works Projects. Manuscript, August 27. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-100.	Plowshare	Buchanan Dam, Cochiti Dam, Travois	General, NCG

AUTHOR	YEAR	MONTH/ DAY	TITLE AND DOCUMENT SOURCE	PROGRAM	PROJECT(S)	OTHER
Lawrence Radiation Laboratory. U.S. Army Engineer Nuclear Cratering Group	1966	10/07	Technical Director's Operation Plan for 20 Ton Cratering Calibration Series, Project Pre -Gondola I. Manuscript, October 7. On file at: Fort Peck Archives, U.S. Army Corps of Engineers, Fort Peck, MT, Box 935.	Plowshare	Pre-Gondola	
Lawrence Radiation Laboratory. U.S. Army Engineer Nuclear Cratering Group	[1966]		Demonstration Project Summary. Manuscript. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-103 [OUO].	Plowshare	Buchanan Dam, Butler Valley Dam, Camelsback Dam, Chomly Cutoff, Cochiti Dam, Coconino Wash, Etsel Dam, Garden Valley Dam, Honokahau Harbor, John Day River Storage, Libby, Missouri River Reservoir, Santa Rosa Wash Basin, Pumped Storage Reservoir, Travois, Wenaha Dam, Young Bay Channel	General, NCG

AUTHOR	YEAR	MONTH/ DAY	TITLE AND DOCUMENT SOURCE	PROGRAM	PROJECT(S)	OTHER
Lawrence Radiation Laboratory. U.S. Army Engineer Nuclear Cratering Group	[1966]		"Cloud Sampling Station, Pre-Gondola II." Drawing No. SK-NCG-PG-34. On file at: Fort Peck Archives, U.S. Army Corps of Engineers, Fort Peck, MT, Box 858.	Plowshare	Pre-Gondola	
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Lawrence Radiation Laboratory. U.S. Army Engineer Nuclear Cratering Group	1967	04/05	Summary of Long Range Programming for Nuclear Excavation Research and Development. Manuscript, April 5. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Cabriolet, Galley, Pre-Schooner	General, NCG
Lawrence Radiation Laboratory. U.S. Army Engineer Nuclear Cratering Group	1967	05/17	Technical Director's Operation Plan for Project Pre-Gondola II, A Wet Medium 140 Ton Row Charge Cratering Experiment in Varying Terrain. Manuscript, May 17. On file at: Fort Peck Archives, U.S. Army Corps of Engineers, Fort Peck, MT, Box 935.	Plowshare	Pre-Gondola	

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Lawrence Radiation Laboratory. U.S. Army Engineer Nuclear Cratering Group	1968	02/15	Engineering Applications of Nuclear Explosives, Bi-Monthly Statistics of NCG Technical Reports, Memoranda, and Studies. Manuscript, February 15. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Bruneau Canyon Dam, Buchanan Dam, Camelsback Dam, Chomly Cutoff, Cochiti Dam, Rampart Canyon Dam, Tennessee-Tombigbee, Twin Springs	General, NCG
Lawrence Radiation Laboratory. U.S. Army Engineer Nuclear Cratering Group	1968	05/00	Project Excavator Preliminary Planning Concept, Twin Springs, Idaho. Manuscript, May. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-065 [OUO].	Plowshare	Excavator	
Lawrence Radiation Laboratory. U.S. Army Engineer Nuclear Cratering Group	1968	09/19	Project Operation Plan for Project Pre-Gondola III. Manuscript, September 19. On file at: Archives and Research Center, Lawrence Radiation Laboratory, Livermore, CA, File PLO-026.	Plowshare	Pre-Gondola	

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Lawrence Radiation Laboratory. U.S. Army Engineer Nuclear Cratering Group	1969	06/00	Technical Concept for Project Tugboat: Explosive Excavation of Kawaihae Light Draft Boat Harbor. Manuscript, Livermore, CA, June. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Tugboat	
Lawrence Radiation Laboratory. U.S. Army Engineer Nuclear Cratering Group	1969	10/01	Summary and Location of Major Cratering Experiments at Fort Peck. Manuscript, Livermore, CA, October 1. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-091.	Plowshare	Pre-Gondola, Trencher	
Lawrence Radiation Laboratory, U.S. Army Engineers Nuclear Cratering Group	1970	12/00	Project Trinidad. Manuscript, December. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Trinidad	
Lawson, Herbert G.	1972	06/08	Plowshare Payoff? The Nuclear Blasting of Gas Wells Appears Near Commercial Use, Contract to Serve 18 Towns in Colorado is Discussed, Seen as a Regulatory Test. <i>Wall Street Journal</i> , June 8. On file at: Archives an Research Center, Lawrence Livermore National Laboratories, Livermore, CA, File PLO-029.	Plowshare	Wagon Wheel	General
Leach, D. L.	1975	02/19	High-Explosive-Induced Fractures in Coal at Kemmerer, Wyoming. University of California, Lawrence Livermore Laboratory, <i>Report UCRL-51764</i> , February 19. Livermore, CA.		Wyoming Coal Gasification	
Leahy, E. J., D. Oltmans, C. M. Snell, T. J. Donlan, and W. B. Lane	1974	12/00	Fallout Simulation: Nuclear Cratering Device Simulation (Project Diamond Ore). U.S. Army Engineer Waterways Experiment Station Explosive Excavation Research Laboratory, Technical Report No. E -74-3, December. Livermore, CA.		Diamond Ore	

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Lederer, Adam M.	2002		Project Wagon Wheel: A Nuclear Plowshare for Wyoming. < http://www.elmada.com/wagon/WW000Plow.html >.	Plowshare	Wagon Wheel	
Lee, Robert R.	1968	05/10	Letter from Robert R. Lee, State of Idaho, Idaho Water Resource Board, to Colonel Robert J. Giesen, May 10. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Bruneau Canyon Dam	
Lee, Robert R.	1968	05/14	Letter from Robert R. Lee, State of Idaho, Idaho Water Resource Board, to Glenn T. Seaborg, May 14. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Bruneau Canyon Dam	
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Lee, William N., and Thomas A. Dalton	1982	04/00	Blast Overturning Analysis of Four Army Vehicles Using Truck 3.0. Report to U.S. Army Armament Research and Development Command, Report ARBRL-CR-00479, Aberdeen Proving Ground, MD, from Kaman Avidyne, Burlington, MA, April. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.		Dice Throw	
Leeson, Edward R.	1964	07/29	Letter from Edward R. Leeson to Lawrence R. Tomei, July 29. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Aquarius	
Lehman, Ronald F.	2004	03/00	Rethinking Atoms for Peace and the Future of Nuclear Technology. <i>Science and Technology Review</i> , Lawrence Livermore National Laboratory, March. Livermore, CA.	Plowshare		General, Overview
Lekas, Mitchell A.	1963	09/20	"Trip Report, Hillsboro, New Mexico." Memo from Mitchell A. Lekas, U.S. Atomic Energy Commission, San Francisco Operations Office, to Distribution, September 20. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-085.	Plowshare	Copper Recovery, Copper Flat	
Lekas, Mitchell A.	1963	11/12	"Trip Report, Miami Copper Corporation." Memo from Mitchell A. Lekas, U.S. Atomic Energy Commission, San Francisco Operations Office, to Files, November 12. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-085 [OUO].	Plowshare	Copper Recovery, Cactus Ore	

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Lekas, Mitchell A., Bruce G. Bray, Harry C. Carpenter, Gerald U. Dinneen, H. H. Aronson, and J. D. Downen	1967	10/13	The Feasibility of Using Nuclear Explosives in the Production of Shale Oil, In The Bronco Oil Shale Study, pp. 1-21, Report PNE 1400, October 13. National Bureau of Standards, U.S. Department of Commerce, Springfield, VA.	Plowshare	Bronco	
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Lewis, A. E.	1968	10/11	Letter with Encls. (Membership Gondola Site Selection Committee, Gondola Proposed Assignments, List of Potential Gondola Sites, and Gondola - Site Selection Schedule) from A. E. Lewis, Lawrence Radiation Laboratory, to Thomas H. Blankenship, October 11. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0038202.	Plowshare	Gondola	
Lewis, A. E.	1969	06/30	"Meeting with Humble Oil Company Representatives in Houston June 17, 1969." Memo from A. E. Lewis, Lawrence Radiation Laboratory, to Distribution, June 30. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	North Slope Harbor	
Lewis, A. E.	1969	07/09	"Contacts Between LRL and Humble Oil Company Prior to July 1, Regarding Construction of a Nuclear Harbor in Alaska." Memo from A E. Lewis, Lawrence Radiation Laboratory, to File, July 9. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, July 9.	Plowshare	North Slope Harbor	

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Lewis, A. E.	1970	08/11	Letter from A. E. Lewis, Lawrence Radiation Laboratory, to A. H. Ewing, August 11. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-087.	Plowshare	Newmont, Copper Ore Chemical Mining	
Lewis, A. E.	1970	12/16	Letter from Arthur E. Lewis, Lawrence Radiation Laboratory, to A. F. Osborne, December 16. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-087.	Plowshare	Newmont, Copper Ore Chemical Mining	
Lewis, A. E.	1971	08/26	Nuclear Chimneys: Underground Containers for Chemical and Metallurgical Processing. Paper for presentation at the Symposium on the Underground Environment, Geological Society of America, Washington, D.C., November 3, 1971. University of California, Lawrence Radiation Laboratory, <i>Preprint UCRL-73130</i> , August 26. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-087.	Plowshare	Copper Ore Chemical Mining	Mining, Copper, Storage, Radioactive
Lewis, A. E.	[1971]		"Wyoming Oil Shale - Retorting Nuclear Chimneys." Memo from Art Lewis, Lawrence Livermore Laboratory, to Glenn Werth. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-105.	Plowshare	Wyoming Oil Shale	
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Lewis, A. E.	1973	09/14	Nuclear In Situ Recovery of Oil from Oil Shale. University of California, Lawrence Livermore Laboratory, <i>Report UCRL-51453</i> , September 14. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-037, PLO-105; and Defense Threat Reduction Information Analysis Center, Albuquerque, NM.	Plowshare		Applications, Oil

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Lewis, A. E., and, Robert L. Braun	1972	01/27	Nuclear Chemical Mining of Primary Copper Sulfides. Paper prepared for AIME 1972 Meeting, San Francisco, CA. University of California, Lawrence Radiation Laboratory, <i>Preprint UCRL-73284</i> , January 27. Livermore, CA.	Plowshare	Copper Ore Chemical Mining	
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Lewis, Arthur E., and Albert J. Rothman	1975	03/05	Rubble In Situ Extraction (RISE): A Proposed Program for Recovery of Oil from Oil Shale. University of California, Lawrence Livermore Laboratory, <i>Report UCRL-51768</i> , March. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-037.	Plowshare		Applications, Oil
Linder, J., K. V. Marsh, J. A. Miskel, and R. J. Nagle	1962	07/12	Project Yo-Yo Radiochemical Measurements. University of California, Lawrence Radiation Laboratory, <i>Report UCRL 6998</i> , July 12. Livermore, CA. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV and Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-073.	Plowshare	Yo-Yo	
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Lombard, David B.	1964	02/25	"Phelps-Dodge (Phase II)." Memo from D. B. Lombard, Lawrence Radiation Laboratory, to Distribution, February 25. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-085.	Plowshare	Copper Recovery	
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Lombard, David B.	1966	01/22	"Dunlap Report." Memo from D. B. Lombard and D. E. Rawson, Lawrence Radiation Laboratory, to G. W. Johnson and G. H. Higgins, January 21. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-106.	Plowshare		General, Correspondence
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Lombard, David B., Bruce G. Bray, Harold W. Sohns, Thomas S. Sterrett, Robert S. Brundage, and Harry C. Carpenter	1967	10/01	A Design for Project Bronco, An Experiment for Nuclear Fracturing and In Situ Retorting of Oil Shale. University of California, Lawrence Radiation Laboratory, University of California, Report UCRL-50339, October 1. Livermore, CA. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0333001.	Plowshare	Bronco	

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Lombard, D. B. and S. M. Hansen	1964	02/04	"Tour of Anaconda Badger Mine." Memo from D. B. Lombard and S. M. Hansen, Lawrence Radiation Laboratory, to Hansom Committee, February 4. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-102.	Plowshare	Zinc Recovery	
Lombard, D. and J. Knox	1965	01/19	"Hansom Economic Potential." Letter from D. Lombard and J. Knox, Lawrence Radiation Laboratory, to G. Johnson and G. Higgins, January 19. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-102 [OUO].	Plowshare	Hansom	Applications, Mining
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Lomnitz, C. and B. A. Bolt	1967	10/00	Evidence on Crustal Structure in California from the Chase V Explosion and the Chico Earthquake of May 24, 1966. <i>Bulletin of the Seismological Society of America</i> , Vol. 57, No. 5, pp. 1093-1114, October.	Vela Uniform	CHASE III, CHASE IV, CHASE V	
Lomnitz, C. and B. A. Bolt	1968		A Comparative Study of the Chase V Explosion and the Chico, California Earthquake of May 24, 1966. <i>The Geological Society of America, Inc., Abstracts for 1967</i> :337. Boulder, CO.	Vela Uniform	CHASE V	
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Lorimer, Bob	1965	10/01	AEC Chemical Blast Gouges Huge Hole in Idaho Desert. <i>The Idaho Daily Statesman</i> , October 1. Boise, Idaho. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-054.	Plowshare	Pre-Schooner II	
Lorimer, Bob	1965	10/03	Pre-Schooner Blast Data Compiled in Preparation for Engineering Project. <i>The Idaho Daily Statesman</i> , October 3. Boise, Idaho. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-054.	Plowshare	Pre-Schooner II	
Lotspeich, George O. Jr.	1964	12/30	Letter from George O. Lotspeich, Jr. to Gary Higgins, December 30. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-086.	Plowshare	Copper Recovery, Copper Flat	
Lucchetti, Linda	2005	04/01	Valuable Documents in Archives & Research Center. <i>Newsline</i> , Vol. 30, No. 13, April 1.	Plowshare		General
Ludwig, Harvey F.	1964	08/05	Letter from Harvey F. Ludwig, Engineering-Science, Inc., Arcadia, CA, to Gerald Johnson, August 5. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-100.	Plowshare	Lake Tahoe Sewage	
Lukasik, S. J.	1967	04/07	Letter from S. J. Lukasik, U.S. Department of Defense, Advanced Research Projects Agency, to W. Kirkness. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0083882.	Vela Uniform	CHASE VI	
Lukasik, S. J.	1973	09/10	Letter from S. J. Lukasik, Defense Advanced Research Projects Agency, to Major General Frank A. Camm, September 10. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-078.	Vela Uniform	Payette	
Lukens, John E.	1968	06/13	Letters to the Editor: Other Side. <i>Centre Daily Times</i> , June 13. State College and Bellefonte, PA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Ketch	
Lundberg, A. W.	1970	04/16	"Underground Engineering Explosive." Memo from A. W. Lundberg, Lawrence Radiation Laboratory, to Distribution, April 16. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-027.	Plowshare		General
Lusk, R. A.	1964	04/21	Letter from R. A. Lusk, Edgerton, Gernshausen & Grier, Inc., to Gerald W. Johnson, April 21.	Plowshare		General

AUTHOR	YEAR	MONTH/ DAY	TITLE AND DOCUMENT SOURCE	PROGRAM	PROJECT(S)	OTHER
Lutton, R. J., F. E. Girucky, R. W. Hunt, and J. R. Curro, Jr.,	1967	12/00	Project Pre-Schooner II: Preshot Geologic and Engineering Properties Investigations. Lawrence Radiation Laboratory, Report PNE 509, December. Livermore, CA. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Pre-Schooner II	
Maccabee, H. D.	1963	07/23	"The Use of Nuclear Explosives for Building Underground 'Cities' for Human Habitation." Memo from H. D. Maccabee, Lawrence Livermore National Laboratory, to G. H. Higgins, July 23. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-100.	Plowshare		General
MacPherson, H. G.	1965	04/28	Letter from H. G. MacPherson, Oak Ridge National Laboratory, Oak Ridge, TN, to John S. Kelly, April 28.	Plowshare	Magnesium Recovery	
Malott, J. P.	1966	09/16	Letter from J. P. Malott, Continental Oil Company, to Glenn T. Seaborg, September 16. On file at Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Dragon Trail	
Mansfield, R.	1960	03/02	"Adit No. 3, Plan and Profile, Project Pre-Vintage, Colorado." Drawing No. L-6-10894 from Lawrence Radiation Laboratory, March 2. On file at: Archives and Records Office, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-105 [OUO].	Plowshare	Pre-Vintage	
Map of Project Carryall			Map of Project Carryall showing railway, highway, apparent edge of channel, crest of lip, and edge of throwout. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Carryall	
Map of Project Wagon Wheel Site			Map of Project Wagon Wheel Site. Map showing site of blast. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0189042.	Plowshare	Wagon Wheel	
Marshall, C. L.	1957	01/02	"Costs of Devices Must be Classified Top Secret." Telex from C. L. Marshall, U.S. Atomic Energy Commission, to R. K. Waterling, January 2. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-90020, 24/26.	Plowshare		General, Device
Marshall, P. D., and A. Douglas	1985		Earthquake or Explosion: Teleseismic Monitoring – Where Are We Now?. In <i>The Vela Program: A Twenty-Five Year Review of Basic Research</i> , Ann U. Kerr, editor, pp. 633-657. Defense Advanced Research Projects Agency, Arlington, VA.	Vela Uniform	West Virginia Earthquake	
Martin, Meladee	1974	08/26	Letter with Encl. (Position Statement) from Meladee Martin, People for Rational Energy Sources, Denver, CO, to Sir, August 26. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-026	Plowshare		General, CO Amendment

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Marvich, E. S.	1963	06/24	Letter from E. S. Marvich, State of Alaska Department of Fish and Game, to Karl Brunstad, June 24. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Spiridon Lake	
Mathews, Ted C.	1958	09/30	Letter with Encl. (The Feasibility of a Harbor at Katalla, Alaska, Report to Lawrence Radiation Laboratory from Exploration Services) from Ted C. Mathews, Exploration Services Inc., Anchorage, AK, to Gerald W. Johnson, September 30. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	Katalla Harbor	
Matthes, Richard W.	1968	11/00	Analysis of the Feasibility of Channel Improvement by Nuclear Excavation at Sergius and Whitestone Narrows, Alaska. U.S. Army Engineer Nuclear Cratering Group, <i>Technical Memorandum</i> No. NCG/TM 68-13, November. Livermore, CA. On file at: Technical Information Center, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.	Plowshare	Sergius Narrows, Whitestone Narrows	
Matthes, Richard W.	1971	02/00	Study of Explosives for Lunar Applications. Lawrence Radiation Laboratory, U.S. Army Engineer Nuclear Cratering Group, <i>NCG Technical Report</i> No. 25, February. Livermore, CA. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.			Applications, Other, Lunar
May, Michael M.	1968	03/04	Letter with Encls. ("Disclosure of LRL Activity Relative to Gold Leaching," memo from David D. Rabb to File, February 28, and "Gold Leaching," memo from G. Werth to File, February 29) from Michael M. May, Lawrence Radiation Laboratory, to John S. Kelly, March 4. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-098.	Plowshare	Gold Leaching	
May, Michael M.	1968	03/15	Letter with Encl. ("Note on Gold Deposits," from Gary Higgins) from Michael M. May, Lawrence Radiation Laboratory, to Glenn T. Seaborg, March 15. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-098.	Plowshare	Gold Leaching	
May, Michael M.	1969	02/19	Letter with Encl. (Review of Project Sloop, Manuscript, February 19) from Michael M. May, Lawrence Radiation Laboratory, to Robert E. Miller, February 19. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-061.	Plowshare	Sloop	
May, Michael M.	1969	04/17	Letter from Michael M. May, Lawrence Radiation Laboratory, to Honorable Craig Hosmer, April 17. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-027.	Plowshare		General

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May, Michael M.	1969	06/24	A Public Corporation for Plowshare. University of California, Lawrence Radiation Laboratory, <i>Report UCRL -50693</i> , June 24. Livermore, CA. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Sloop	General
May, Michael M.	1969	08/04	Letter from Michael M. May, Lawrence Radiation Laboratory, to Robert Kleberg, Jr., August 4.	Plowshare		General
May, Michael M.	1969	08/11	Letter from Michael M. May, Lawrence Radiation Laboratory, to Gerard C. Gambs, August 11.	Plowshare	Thunderbird	
May, Michael M.	1970	01/07	"Joint Committee Between LRL and Sandia on Plowshare." Memo from Michael M. May, Lawrence Radiation Laboratory, to G. C. Werth, et al., January 7. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare		General, Correspondence
May, Michael M.	1970	03/05	Statement of Dr. Michael M. May, Director, LRL-Livermore, Before the Joint Committee on Atomic Energy on March 5, 1970. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		General, JCAE
McAnally, H. E.	1969	12/01	"Bottom Hole Pressure for the Hydrological Test Run on Wagon Wheel No. 1." Memo from H. E. McAnally, El Paso Natural Gas Company, Farmington, NM, to C. E. Matthews, December 1.	Plowshare	Wagon Wheel	
McAneny, Colin, C.	1975	01/00	Project Lost Creek: Field Tests of Mounding and Controlled Blasting. U.S. Army Engineer Waterways Experiment Station Explosive Excavation Research Laboratory, Technical Report No. E-75-1, January. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Lost Creek	
McCance, Don	1969	04/03	Summary of Long Range Programming for Nuclear Excavation Research and Development. Manuscript, April 5. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Yawl	
McCarvill, Thomas J.	1968	10/31	"Proposed Alternate Site for Project Travois--Catherine Creek, Oregon." Letter with Encl. ("Catherine Creek Project," Memo from Thomas W. Nelson, Department of the Army, to Thomas McCarvill, October 24 [OUOJ]) from Thomas J. McCarvill, U.S. Atomic Energy Commission, Division of Peaceful Nuclear Explosives, October 31. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-065.	Plowshare	Catherine Creek, Excavator, Travois	

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McCarvill, Thomas J.	1969	01/31	Letter from Thomas J. McCarvill, U.S. Atomic Energy Commission, Division of Peaceful Nuclear Explosives, to Charles C. Bates, January 31. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	North Slope Harbor	
McCarvill, Thomas J.	1969	03/10	"Report on Meeting with the U.S. Coast Guard and Corps of Engineers." Memo from Thomas J. McCarvill, U.S. Atomic Energy Commission, Division of Peaceful Nuclear Explosives, to Files, March 10. On file at: Archives and Research Center, Lawrence Livermore, National Laboratory, Livermore, CA, File PLO-074.	Plowshare	North Slope Harbor	
McCarvill, Thomas J.	1969	04/14	"Officials Contacted Re Alaskan Harbor." Memo from Thomas J. McCarvill, U.S. Atomic Energy Commission, Division of Peaceful Nuclear Explosives, to Files, April 14. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	North Slope Harbor	
McCool, W. B.	1962	07/10	"Atomic Energy Commission, Plowshare Excavation Program." Note with Encl. (Plowshare Program, Nuclear Excavation Application, manuscript) from W. B. McCool, U.S. Atomic Energy Commission, Report 811/105, July 10. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0075573.	Plowshare	Dogsled, Phaeton, Sedan, Schooner, Canoe,	
McCool, W. B.	1968	04/26	"Atomic Energy Commission Status of Plowshare Industrial Projects." Memo with Encl. ("Status of Plowshare Industrial Projects," memo from John S. Kelly, U.S. Atomic Energy Commission, Division of Peaceful Nuclear Explosives, to List) from W. B. McCool, U.S. Atomic Energy Commission to Distribution, April 26. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029 [OUO].	Plowshare	Aquarius, Bronco, Dragon Trail, Undersea Fuel Oil Storage, Ketch, Sloop, Wagon Wheel, WASP	General
McCool, W. B.	1969	04/08	"Meeting with Humble Oil Re Alaskan Harbor." Memo with Encl. (memo with Attached Map from Donald C. Kull, U.S. Atomic Energy Commission, to Distribution, April 8) from W. B. McCool, U.S. Atomic Energy Commission, to Distribution, April 8. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	North Slope Harbor	
McDonald, H. C.	1969	06/25	"Distribution." Distribution Lists from H. C. McDonald, Lawrence Radiation Laboratory, June 25. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-072.	Plowshare	Yawl	

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McDonald, H. C.	1969	07/16	"Event Electronics Engineer (E ³) and Event Electronics Coordinator (E ² C)." Memo from H. C. McDonald, Lawrence Radiation Laboratory, to Distribution, July 16. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-072.	Plowshare	Yawl	
McDonald, Robert E.	1968	03/00	Feasibility Study, Nuclear Stimulation of Green River Basin, Wyoming and Piceance Creek Basin, Colorado Natural Gas Reservoirs. Report from Wolf Exploration Company, Denver, CO. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Dragon Trail	
McGarr, H. J.	1971	06/22	Letter with Encls. (letter from H. J. McGarr to Glen Clark, June 17 and List of Firms) from H. J. McGarr, Holmes & Narver, to G. H. Higgins, June 22. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-087.	Plowshare	Copper Ore Chemical Mining	
McGlaun, J. Michael	1980	09/00	Computer Modeling of the Pre-Gondola Cratering Experiments. Sandia National Laboratories, Report No. SAND80-1695, September. Albuquerque, NM.	Plowshare	Pre-Gondola	
McIntire, Elliot G.	1961	01/30	Hawaiian Islands: With Special Reference to Kaneohe Bay, Oahu, South Point, Hawaii Waimea District, Kauai. Library Brochure for Pacific Missile Range, Point Mugu, CA, from University of California, Riverside (William L. Thomas, Jr. editor), January 30. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	South Point Harbor	
McKinnis, W. B.	1969	10/15	"Station U15j, Cancellation of Criteria." Memo from W. B. McKinnis, Lawrence Radiation Laboratory, to Distribution, October 15. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-072.	Plowshare	Yawl	
McLaughlin, Donald H.	1960	01/26	Letter from Donald H. McLaughlin to Spofford G. English, January 26. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Ditchdigger	General, PAC
Melcher, John	1969	12/08	Letter from John Melcher, House of Representatives, Washington, D.C., to B. P. Pendergrass, December 8. On file at: Fort Peck Archives, U.S. Army Corps of Engineers, Fort Peck, MT, Box 860 Folder 1520-30.	Plowshare	Duck Creek Channel	
Merritt, M. L.	1965	03/29	Letter from M. L. Merritt, Sandia Corporation, to Robert E. Miller, March 29. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-065.	Plowshare	Tennessee-Tombigbee Waterway	
Merritt, M. L.	1965	03/31	Letter from M. L. Merritt, Sandia Corporation, to Robert E. Miller, March 31. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-065.	Plowshare	Tennessee-Tombigbee Waterway	

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Metals Week	1968	04/22	Plowshare Gold Mining Tests Look Good. <i>Metals Week</i> , April 22. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-098.	Plowshare	Gold Leaching	
Metzger, H. Peter	1975	07/20	A-Scientists too Fond of Nuclear Explosions. <i>Rocky Mountain News "Trend,"</i> July 20. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		General
Metzger, H. Peter	1975	08/31	Nuclear Stimulation Plan Limps Into Oblivion. <i>Rocky Mountain News "Trend,"</i> August 31. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Pacer	General
Meyer, J. W.	1977	04/15	Pre-Dice Throw II: Crater and Permanent Displacement Study. Report to Defense Nuclear Agency, Washington, D.C., from U.S. Army Engineer Waterways Experiment Station, Weapons Effects Laboratory, Vicksburg, MS, April 15. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.		Pre-Dice Throw	
Meyer, J. W., and A. D. Rooke, Jr.	1969	09/00	Mine Shaft Series Events Mine Under and Mine Ore: Ejecta Studies. U.S. Army Engineer Waterways Experiment Station, Miscellaneous Paper N-69-2, September. Vicksburg, MS. On file at: U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.	DNA	Mine Ore, Mine Under	
Meyer, J. W., and A. D. Rooke, Jr.	1973	09/00	Operation Mine Shaft: Distribution of Natural and Artificial Ejecta Resulting from Detonation of 100-Ton TNT Charge on Granite: Mineral Rock Event. Manuscript, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS, September. On file at: U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.	DNA	Mineral Rock	
Michaelson, S. D.	1970	05/00	A Summary Paper on Nuclear Mining. In <i>Symposium on Engineering with Nuclear Explosives: Proceedings</i> , Report CONF-700101, Vol. 1, pp.859-863, May. American Nuclear Society, Hinsdale, IL.	Plowshare	Sloop	
Mickey, W. V.	1963	08/00	Operation Pre-Dribble, Seismic Effects of 1000 Lb H-E Detonations in Salt and Sedimentary Deposits. Manuscript, U.S. Department of Commerce, Coast and Geodetic Survey, Washington, D.C., August. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.	Vela Uniform	Pre-Dribble	
Mickey, M. V., and T. R. Shugart	1964	01/00	Seismic Data Summary Nuclear Detonation Program 1961 through 1963. U.S. Department of Commerce, Coast and Geodetic Survey, Washington, D. C., January. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.			Seismic

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Midkiff, Frank E.	1968	05/21	Letter from Frank E. Midkiff, Bernice P. Bishop Estate, Honolulu, HI, to Glenn T. Seaborg, May 21. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0075928; and Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-078.	Plowshare	South Point Harbor	
Midkiff, Frank E.	1968	06/26	"Nuclear Cratering Project." Memo from Frank E. Midkiff, Bernice P. Bishop Estate, Honolulu, HI, to Trustees, June 26. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-078.	Plowshare	South Point Harbor	
Midkiff, Frank E.	1968	06/26	Letter from Frank E. Midkiff, Bernice P. Bishop Estate, Honolulu, HI, to Glenn T. Seaborg, June 26. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0075934; and Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-078.	Plowshare	South Point Harbor	
Miles, Robert A.	1958	09/04	"Report on Construction of Earth-Fill and Rock-Fill Dams by Nuclear Explosions." Memo with Encl. (Construction of Earth-Fill and Rock-Fill Dams by Nuclear Explosions, manuscript, July 21) to Distribution, September 4. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-9001, 2/18.	Plowshare	Swan Lake	
Miller, David F.	1968	04/18	"Press Query Regarding Bronco." Memo from David F. Miller, U.S. Atomic Energy Commission, Nevada Operations Office, to Files. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0325234.	Plowshare	Bronco	
Miller, G. M., Jr.	1975	04/00	ESSEX - Diamond Ore Research Program: Test Execution Report - ESSEX I, Phase 1, Nuclear Cratering Device Simulation (Project ESSEX). Defense Nuclear Agency, Report DNA PR 0001, Washington, D. C.; U.S. Army Engineer Waterways Experiment Station, Report WES MP E-75-6, Vicksburg, MS, April. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.		ESSEX	
Miller, L. G.	1956	12/17	Memo with Encl. (letter from C. L. Marshall, U.S. Atomic Energy Commission, to R. K. Wakerling) from L. Miller, Lawrence Radiation Laboratory, to W. Brobeck, December 17. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900020, 24/26.	Plowshare		Application, Power Production

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Miller, L. G., S. M. Prestwich, and J. L. Griffith	1978	12/00	INEL/Snake River Plain Geothermal Drilling and Testing Plan, INEL-1 Well, Butte County, Idaho. U.S. Department of Energy, Idaho Operations Office, Report No. IDO-10077, December. Idaho Falls, ID. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Geothermal Power	
Miller, Robert E.	1960	03/23	Telex from R. E. Miller, U.S. Atomic Energy Commission, Albuquerque Operations Office, to Holmes & Narver, March 23. On file at: Nuclear Testing Archives, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0069202.	Plowshare	Pinot, Plowboy	
Miller, Robert E.	1962	06/19	"Project Surrey." Memo from R. E. Miller, U.S. Atomic Energy Commission, Nevada Operations Office, to Gary H. Higgins, June 19. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0306432.	Plowshare	Surrey	
Miller, Robert E.	1962	09/21	"Meeting with West Virginia Atomic Energy Commission." Memo from Robert E. Miller, U.S. Atomic Energy Commission, to Those Listed, September 21. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0309951.	Plowshare	Earth Furnace, Experiment, Megawatt, Mountain Lake, Wheelbarrow	
Miller, Robert E.	1963	04/30	"Project Dogsled." Memo from Robert E. Miller, U.S. Atomic Energy Commission, Nevada Operations Office, to List, April 30. On file at: Nevada Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0018528 [OUO].	Plowshare	Dogsled, Pre-Dogsled	
Miller, Robert E.	1966	03/23	"Inquiries to NVOO Regarding Industrial Application of Nuclear Explosives." Memo from Robert E. Miller, U.S. Atomic Energy Commission, Nevada Operations Office, to List, March 23. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Bo-Peep, Appalachian Gas Storage	
Miller, Robert E.	1967	12/26	"Budgetary Estimates for Travois." Telex from Robert E. Miller, U.S. Atomic Energy Commission, Nevada Operations Office, to Lt Col M. K. Kurtz, December 26. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-065.	Plowshare	Buchanan, Travois	
Miller, Robert E.	1968	12/31	Reorganization - Nevada Operations Office Effects Safety Program. Draft Manuscript, U.S. Atomic Energy Commission, December 31. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0133972.	Plowshare	Gondola, Dragon Trail, Bronco, Sloop	General

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Miller, Robert E.	1969	01/27	Letter from Robert E. Miller, U.S. Atomic Energy Commission, Nevada Operations Office, to Herbert E. Grier, January 27. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-012. .	Plowshare	Dragon Trail	
Miller, Robert E.	1969	06/10	Vast Waterway to Link Vancouver, Great Lakes? The Financial Post, May 2.	Plowshare	Dragon Trail	
Miller, Robert E.	1970	02/20	"Termination of Gondola Site Selection Committee and the Manager's Review Group." Memo with Encl. (Gondola Site Selection Committee Summary of Activities, manuscript) from Robert E. Miller, U.S. Atomic Energy Commission, Nevada Operations Office, to List, February 20. On file at Nevada Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0038196.	Plowshare	Gondola	
Miller, Robert E.	1970	03/04	"Amendment No. 1 - DPNE (Plowshare) Work Authorization 70-6, Wasp/Wagon Wheel - Field Planning and Support." Memo from Robert E. Miller, U.S. Atomic Energy Commission, Nevada Operations Office, to R. H. Thalgott et al., March 4. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0173145.	Plowshare	WASP; Wagon Wheel	
Miller, Robert E.	1972	09/26	Letter from Robert E. Miller, The Resources Sciences Corporation, to Garey H. Higgins, September 26.	Plowshare		General, Correspondence
Mills, Robert R., Jr.	1972	07/28	"Status Report - Rapid Excavation with Explosives." Letter with Encl. ("Status Report, Effective Date: 30 June 1972") from Robert R. Mills, Jr., U.S. Army Engineer Waterways Experiment Station Explosive Excavation Research Laboratory, Corps of Engineers, to Director, U.S. Army Engineers Waterways Experiment Station, July 28. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-108.	Plowshare	Diamond Ore, Kaalualu Bay Harbor, Libby, Lost Creek, Mini Ore	General, EERO
Mills, Robert R., Jr.	1972	10/10	"Status Report - Rapid Excavation with Explosives." Letter with Encl. ("Status Report, Effective Date: 30 September 1972") from Robert R. Mills, Jr., U.S. Army Engineer Waterways Experiment Station Explosive Excavation Research Laboratory, Corps of Engineers, to Director, U.S. Army Engineer Waterways Experiment Station, October 10. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-108.	Plowshare	Diamond Ore, Kaalualu Bay Harbor, Libby, Lost Creek, R. D. Bailey, Trinidad, Tugboat	General, EERO
Mills, Robert R., Jr.	1974	07/25	Letter from Robert R. Mills, Jr., Director, U.S. Army Corps of Engineers, to Kenneth Street, July 25. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		General, EERL

AUTHOR	YEAR	MONTH/ DAY	TITLE AND DOCUMENT SOURCE	PROGRAM	PROJECT(S)	OTHER
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Nordyke, Milo D.	1969	04/11	Letter from Milo D. Nordyke, Lawrence Radiation Laboratory, to Stanley B. Hass, April 11. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	North Slope Harbor	
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Onaka, Wayne T.			A Telemetry System for Monitoring Gamma Radiation in Plowshare Experiments. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-50633</i> . Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-036.	Plowshare		Misc.
O'Neill, Robert D.	1968	02/16	"Congressman Saylor Opposed to Project Ketch." Memo with Encl. ("Project Ketch: Underground Explosion of AEC," Congressional Record, February 15, 1968, Hon. John P. Saylor) from Robert D. O'Neill to Seaborg et al., February 16. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0176862.	Plowshare	Ketch	
Operation Payette Tasks	1973	11/27	Operation Payette Tasks. Schedule, November 27. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0187811.	Vela Uniform	Payette	
Orange Torpedo River Adventures			Lost Creek Lake. Orange Torpedo River Adventures, Lost Creek Lake, OR. < http://www.ohwy.com/or/l/lostcrlk.htm >.	Plowshare	Lost Creek	
O'Toole, Thomas	1974	06/09	U.S. May Have to Use A-Blasts to Obtain Natural Gas, Study Finds. <i>The Washington Post</i> , June 9. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		General, Gas
Owen and Begich, Senators	1964	02/20	Senate Resolution No. 9: In the Legislature of the State of Alaska, Third Legislature - Second Session, February 20. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Spiridon Lake	
Pang, S. H., and J. Isenberg	1977	05/00	ESSEX - Diamond Ore Research Program: Structural Response Analysis for ESSEX V. Defense Nuclear Agency, Report DNA PR 0030, Washington, D.C., U.S. Army Engineer Waterways Experiment Station, Report MP N-77-2, Vicksburg, MS, May. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.		ESSEX	

AUTHOR	YEAR	MONTH/ DAY	TITLE AND DOCUMENT SOURCE	PROGRAM	PROJECT(S)	OTHER
Pang, S. H., and J. Isenberg	1978	05/00	ESSEX - Diamond Ore Research Program: Structure-Medium Interaction and Structural Response Calculations for the ESSEX Phase 3 Event. U.S. Waterways Experiment Station, Report WES TR N-78-3, Vicksburg, MS, May. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.		ESSEX	
Parks, Donald E., and Leo A. Rogers	1972	10/01	Preliminary Predictions of Wagon Wheel Chimney Temperature. In Project Wagon Wheel: Technical Studies Report Number Two, Leo A. Rogers, editor, pp. E1-E35. El Paso Natural Gas Company, Report PNE-WW-13, October 1. El Paso, TX. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Wagon Wheel	
Pasternak, Alan	1974	10/03	"1) First Chemistry Coal Program Review Meeting Thursday, October 10, 9:30 - 11:30 - COPA Room; 2) Formation of Coal Processing Advisory Group." Memo from Alan Pasternak, Lawrence Livermore Laboratory, to Distribution, October 3. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-085.		Wyoming Coal Gasification	
Pastore, Richard M.	1973	05/09	"Status of NV Plowshare Activities - April 1973." Memo from Richard M. Pastore, U.S. Atomic Energy Commission, Nevada Operations Office, to Gerald W. Johnson, May 9. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030 [OUO].	Plowshare	Copper Ore Chemical Mining	General, Status
Patterson, Dan W.	1964	06/08	Theory of Nuclear Explosion in a Cavity Including the Effects of Shock and Nonelastic Effects on the Wall and Comparison with Tamped Explosions - Project Dribble. University of California, Lawrence Radiation Laboratory, Report UCRL-7916, June 8. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-012 and PLO-029.	Vela Uniform	Dribble, Salmon, Sand, Tar	
Patterson, R. J.	1965	07/14	"Project Dribble Recreational Fund." Memo from R. J. Patterson to P. L. Randolph, July 14. On file at: Lawrence Berkeley National Laboratory, Berkeley, CA, File Folder Non-Military Uses, Weapons Program , General Correspondence, DC 1965.	Vela Uniform	Dribble	
Patton, Henry H.	1965	02/16	Letter from Henry H. Patton, Frederic H. Hatch & Co., Inc., to Gerald W. Johnson, February 16. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-087.	Plowshare	Copper Recovery, Copper Flat	
Peacock, Darnell	1969	09/25	Teller Stresses Nuclear Safety. <i>The Houston Post</i> , Section 2, p. 4, September 25. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	North Slope Harbor	

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Peck, Dallas L., Thomas L. Wright, and Robert W. Decker	1979		The Lava Lakes of Kilauea. <i>Scientific American</i> , Vol. 241, pp.114-129.	Plowshare	Iki	
Pedersen, Ole	1976	03/09	Letter from Ole Pedersen, International Atomic Energy Agency, to L. Ballou, March 9. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-028.	Plowshare		General, IAEA
Pendergrass, B. P.	1969	12/16	Letter from B. P. Pendergrass, U.S. Army Corps of Engineers, Omaha District, to Honorable John Melcher, December 16. On file at: Fort Peck Archives, U.S. Army Corps of Engineers, Fort Peck, MT, Box 860 Folder 1520-3.	Plowshare	Duck Creek Channel	
Pendergrass, B. P.	1971	08/13	Letter from B. P. Pendergrass, U.S. Army Corps of Engineers, Omaha District, to P. J. Construction Company, Inc., August 13. On file at: Fort Peck Archives, U.S. Army Corps of Engineers, Fort Peck, MT, Box 927.		Diamond Ore	
People Against Ketch	1968	06/00	Pennsylvanians Are You Against Underground Nuclear Blasting in Your State Forests? Notice from People Against Ketch, panel discussion on Project Ketch, State College, PA [June]. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Ketch	
Perlman, David	1963	02/10	Livermore Experiment: A Test Ban Puzzler---The Peaceful Blasting. <i>San Francisco Chronicle</i> , February 10. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		General
Perlman, David	1966	05/26	UC's Atomic 'Find.' <i>San Francisco Chronicle</i> , May 26. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		General
Perlman, David	1968	09/05	Canal A-Blast Problems. <i>San Francisco Chronicle</i> , September 5. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare		General
Perlman, David	1969	12/03	An A-Blast Key to Volcanic Energy. <i>San Francisco Chronicle</i> , December 3. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Geothermal Power Plant	

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Perry, Gerald L. E., Craig C. Hudson, and Bruce P., Loring	1977	03/00	Analysis of Ground Motion Data and Prediction Techniques from the Pre-Throw Events. Report to Defense Nuclear Agency, Report DNA 4363F, Washington, D.C., from General Electric Company, Albuquerque, NM, March. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.		Pre-Dice Throw	
Perry, O. W., H. C. Prentice, J. L. Peterson, Jr., John G. Fry, Roy A. Stane, Wm. H. Crutchfield, Jr., John F. Phillip, Harold B. Curtis, Milo D. Nordyke, Harlan H. Zodtner, and Louis J. Cicero	1963	11/00	Project Carryall Feasibility Study. Report from California State Division of Highways, Atchison, Topeka and Santa Fe Railway Company, and U.S. Atomic Energy Commission, November. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA..	Plowshare	Carryall	
Peterson, M. G.	1967	06/07	"Project Ketch Phase 1 Scope." Letter with Encl. ("Technical Program, Engineering, Construction and Support, Scope of Work, Ketch - Phase I") from M. G. Peterson, Lawrence Radiation Laboratory, to W. D. Smith, Jr., June 7. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Ketch	
Peterson, Roy J.	1963	02/06	Letter from Roy J. Peterson, Richard Peterson & Son, Novato, CA, to Gary H. Higgins, February 6, and response from G. H. Higgins, April 22. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	San Luis Dam	General, Correspondence
Peterson, Roy J.	1964	11/30	Letter from Roy J. Peterson, Richard Peterson & Son, Novato, CA, to John S. Kelly, November 30. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare		General, Correspondence
Peterson, Roy J.	1964	12/03	Letter from Roy J. Peterson, Richard Peterson & Son, Novato, CA, to Gerald W. Johnson, December 3. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	San Luis Dam	

AUTHOR	YEAR	MONTH/ DAY	TITLE AND DOCUMENT SOURCE	PROGRAM	PROJECT(S)	OTHER
Peterson, Roy J.	1964	12/03	Letter from Roy J. Peterson, Richard Peterson & Son, Novato, CA, to W. McGurn, December 3. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare		General, Correspondence
Peterson, Roy J.	1964	12/03	Letter from Roy J. Peterson, Richard Peterson & Son, Novato, CA, to Glenn T. Seaborg, December 3. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare		General, Correspondence
Peterson, Roy J.	1964	12/03	Letter from Roy J. Peterson, Richard Peterson & Son, Novato, CA, to Edward Teller, December 3. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare		General, Correspondence
Peterson, Roy J.	1965	04/22	Nuclear Explosives for Peaceful Purposes. Manuscript, Richard Peterson & Son, Licensed Contractor Specializing in Drilling, Blasting, Novato, CA, April 22. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	San Luis Dam	General
Petit, Charles	1970		Peaceful Atom Talks Show Success. <i>Livermore Herald and News</i> . Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		General, IAEA
Petrie, R. B.	1959	08/11	"Oil Shale H.E. Test." Memo from R. B. Petrie, Lawrence Radiation Laboratory, to C. M. Bacigalupi, August 11. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-032 [OUO].	Plowshare	Pinot	
Petrie, R. B.	1959	11/19	"Pre-Vintage Cost Estimate - Basic Construction Only." Memo from R. B. Petrie, Lawrence Radiation Laboratory, to Frank Adelman, November 19. On file at: Archives and Records Office, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-105.	Plowshare	Pre-Vintage	
Petrie, R. B.	1959	11/19	"Project Pre-Vintage, Construction Time Schedule." Memo from R. B. Petrie, Lawrence Radiation Laboratory, to Frank Adelman, November 19. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, PLO-105.	Plowshare	Pre-Vintage	
Petrie, R., and F. Warren	1960	03/09	Telex from R. Petrie and F. Warren, Lawrence Radiation Laboratory, to W. D. Gibbins, March 9. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession NV0069371.	Plowshare	Plowboy	
Petrol Industries, Inc.			Proposal for Drilling Program, Caddo Pine Island. Report from Petrol Industries, Inc. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-106.	Plowshare	Caddo Pine Island	

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Petrovic, Louis J.	1973	03/20	Letter with Encl. ("Visit to Atomic Energy Commission, Lawrence Livermore Laboratory, Livermore, California, February 22, 1973," memo from F. A. Hard, P. Huska, and L. J. Petrovic to J. C. Agarwal, March 9) from Louis J. Petrovic, Ledgemont Laboratory, Kennecott Copper Corporation, to Arthur Lewis, March 20. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-088.	Plowshare	Copper Ore Chemical Mining	
Philip, John F.	1960	10/14	Industrial Participation in the Plowshare Program. Manuscript, U.S. Atomic Energy Commission, San Francisco Operations Office, October 14. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900157, 7/18.	Plowshare		General
Philip, John F.	1962	08/13	"Yukon River Diversion." Letter from John F. Philip, U.S. Atomic Energy Commission, San Francisco Operations Office, to Colonel C. Hanburger, August 13. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	Yukon River Diversion	
Philip, John F.	1962	08/13	"Yukon River Diversion." Letter from John F. Philip, U.S. Atomic Energy Commission, San Francisco Operations Office, to Gary H. Higgins, August 14. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	Yukon River Diversion	
Philip, John F.	1962	08/14	"Approach to Negotiations with Texas Gulf Sulfur Company for Surrey." Telex from John F. Philip, U.S. Atomic Energy Commission, San Francisco Operations Office, to R. E. Miller, August 14. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0306361.	Plowshare, Vela Uniform	Surrey	
Philip, John F.	1962	11/26	"FY 1963 Plowshare Program Guidance." Memo from John F. Philip, U.S. Atomic Energy Commission, San Francisco Operations Office, to Distribution, November 26. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-027 [OUO].	Plowshare		General, Procedures
Philip, John F.	1962	12/04	"Yukon River Diversion." Letter from John F. Philip, U.S. Atomic Energy Commission, San Francisco Operations Office, to Gary Higgins, December 4. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	Yukon River Diversion	
Philip, John F.	1963	06/21	Letter from John F. Philip, U.S. Atomic Energy Commission, San Francisco Office, to Harlan Zodtner, June 21. On file at: Lawrence Berkeley National Laboratory, University of California, Berkeley, CA, File 434-900157, 18/18 [OUO].	Plowshare	Carryall	

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Philip, John F.	1963	11/01	"Meeting with Kennecott Corporation on October 23, 1963." Memo with Encl. ("SAN-LRL-Kennecott Meeting," from Mitchell A. Lekas to Files) from John F. Philip, U.S. Atomic Energy Commission, San Francisco Operations Office, to Distribution, November 1. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-085 [OUO].	Plowshare	Sloop	
Philip, John F.	1964	07/31	Letter from John F. Philip, U.S. Atomic Energy Commission, San Francisco Operations Office, to R. P. Kelly, July 31. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-078.	Plowshare	NAWAPA	
Philip, John F.	1964	07/31	Letter with Encls. (List of Attendees at July 28 Meeting, List of Reports forwarded to Parsons Co.) from John F. Phillip, U.S. Atomic Energy Commission, San Francisco Office, to Gerald W. Johnson, July 31. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-078.	Plowshare	NAWAPA	
Philip, John F.	1965	02/26	Letter with Encl. (Project Sloop Status Report, February 25, 1965, manuscript and draft outline of Project Sloop study) from John F. Philip, U.S. Atomic Energy Commission, San Francisco Operations Office, to Gerald W. Johnson, February 26. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-087 [OUO].	Plowshare	Copper Recovery, Sloop, Copper Flat	
Philip, John F.	1965	05/27	Letter from John F. Philip, U.S. Atomic Energy Commission, San Francisco Operations Office, to Multiple Recipients, May 27. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-060.	Plowshare	Sloop	
Philip, John F.	1966	10/09	Letter from John F. Philip, U.S. Atomic Energy Commission, San Francisco Operations Office, to Robert G. Dove, October 9. On file at: Lawrence Berkeley National Laboratory, Berkeley, CA, File 454-900205, 16/48.	Plowshare		General, Purchase Order
Philip, John F.	1967	01/00	Letter with Encls. (memo from H. B. Curtis to J. F. Philip, November 22, 1966; and memo from H. B. Curtis to J. F. Philip, December 15, 1966) from Harold B. Curtis for John F. Philip, U.S. Atomic Energy Commission, San Francisco Operations Office, to Glenn C. Werth, January. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-109.	Plowshare	Central Arizona Aqueduct	
Philip, John F.	1967	01/06	Letter from John F. Philip, U.S. Atomic Energy Commission, San Francisco Operations Office, to Glenn C. Werth, January 6. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-001.	Plowshare	Aquarius	

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Philip, John F.	1967	01/25	Letter from John F. Philip, U.S. Atomic Energy Commission, San Francisco Operations Office, to Glenn C. Werth, January 25. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-011.	Plowshare	Dragon Trail	
Philip, John F.	1967	04/07	Letter from J. F. Philip, U.S. Atomic Energy Commission, San Francisco Office, April 7, to Glenn C. Werth. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-001.	Plowshare	Aquarius	
Philip, John F.	1967	09/06	Letter from John F. Philip, U.S. Atomic Energy Commission, San Francisco Operations Office, to Glenn C. Werth, September 6. On file at Archives and Research Center, Lawrence Livermore National Laboratory, DA, File PLO-001 and PLO-109.	Plowshare	Aquarius	
Philip, John F.	1967	11/22	"Status Report – Arizona AEC/University of Arizona Plowshare Study of Water Resources Management." Memo from John F. Philip, Atomic Energy Commission, San Francisco Office, to Robert E. Miller, et al., November 22. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-001.	Plowshare	Aquarius	
Philip, John F.	1967	12/15	"Arizona Atomic Energy Commission Water Resources Management Project." Letter from John F. Philip, U.S. Atomic Energy Commission, San Francisco Operations Office, to Glenn C. Werth, December 15. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-001.	Plowshare	Aquarius	
Philip, John F.	1967	12/15	"Arizona Atomic Energy Commission Preliminary Report on Water Resources Management." Letter from John F. Phillip, Special Projects Division, U.S. Atomic Energy Commission, San Francisco Office to W. S. Twenhofel, December 15. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-001.	Plowshare	Aquarius	
Philip, John F.	1971	06/02	"Bureau of Mines Report on Copper Leaching Studies." Letter from John Philip, U.S. Atomic Energy Commission, San Francisco Operations Office, to Richard Hamburger, June 2. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-087.	Plowshare	Copper Recovery	
Pickering, I. G., J. F. Philip, Gary H. Higgins, Peter F. Zimmer, and W. W. Allaire	1967	10/11	"Sloop Report Announcement." Transcript: Kennecott Copper Cooperation; U.S. Atomic Energy Commission, San Francisco Operations Office; Lawrence Radiation Laboratory; U.S. Atomic Energy Commission, Nevada Operations Office, October 11. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Sloop	

AUTHOR	YEAR	MONTH/ DAY	TITLE AND DOCUMENT SOURCE	PROGRAM	PROJECT(S)	OTHER
Piper, Arthur M.	1968		Potential Applications of Nuclear Explosives in Development and Management of Water Resources- Preliminary Canvass of the Ground Water Environment. Report to U.S. Atomic Energy Commission from U.S. Department of the Interior, Geological Survey, Report TEI-873. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-109.	Plowshare		Applications, Water
Piper, Arthur M., and Frank W. Stead	1965	03/00	Potential Applications of Nuclear Explosives in Development and Management of Water Resources--Principles. Report to U.S. Atomic Energy Commission from U.S. Department of the Interior, Geological Survey, Report TIE-857, March.	Plowshare		Applications, Water
Placak, Oliver R.	1965	06/15	Letter from Oliver R. Placak, U.S. Public Health Service, Las Vegas, NV, to R. H. Thalgott, June 15. On file at: National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0162674.	Plowshare	Sloop	
Plowshare Advisory Committee	1959	10/30	Katalla Harbor. Report prepared for Plowshare Advisory Committee Briefing, November 12-13, October 30. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Katalla Harbor	
Plowshare Advisory Committee	1959	10/30	Oil Shale (Project Vintage). Report prepared for Plowshare Advisory Committee Briefing, November 12-13, October 30. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Vintage	
Plowshare Advisory Committee	1959	11/13	Plowshare Advisory Committee Briefing, November 12-13, 1959, agenda. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Katalla Harbor, Vintage	General, PAC
Plowshare Advisory Committee	1959	11/13	Report of the Plowshare Advisory Committee, November 12-13. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029 [OUO].	Plowshare	Ditchdigger , Vintage	General, PAC
Plowshare Advisory Committee	[1959]		Charter for AEC Advisory Board. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		General, PAC
Plowshare Advisory Committee	1960	01/15	Second Plowshare Advisory Committee Meeting. Meeting held at Lawrence Radiation Laboratory, Livermore, CA. Agenda. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900157, 7/18.	Plowshare		General, PAC

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Plowshare Advisory Committee	1960	01/15	Second Report on the Plowshare Advisory Committee, January 15. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029 [OUO].	Plowshare	Ditchdigger	General, PAC
Plowshare Advisory Committee	1960	05/26	Report on Plowshare Advisory Committee Meeting, May 25-26. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029 [OUO].	Plowshare	Wagon	General, PAC
Plowshare Advisory Committee	1960	10/20	Plowshare Advisory Committee Meeting. LRL Statements for 4 th Plowshare Advisory Committee Meeting, Albuquerque New Mexico, October 19 and 20, 1960. Report, October 20. On file at Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Iki, Pinot	General, PAC
Plowshare Advisory Committee	1961	02/10	Report of the Plowshare Advisory Committee. Report, February 10. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Ditchdigger	General, PAC
Plowshare Advisory Committee	1961	06/08	Sixth Report of the Plowshare Advisory Committee. Meeting held at Los Alamos Scientific Laboratory, Los Alamos, New Mexico, June 7-8. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029 [OUO].	Plowshare	Wagon	General, PAC
Plowshare Advisory Committee	1961	10/31	Seventh Report of the Plowshare Advisory Committee. Meeting held in Carlsbad, New Mexico, October 30-31. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029 [OUO].	Plowshare	Wagon	General, PAC
Plowshare Advisory Committee	1962	12/05	Plowshare Advisory Committee, Report on the Ninth Meeting. Meeting held at U.S. Atomic Energy Commission, Nevada Operations Office, Las Vegas, NV, December 4-5. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029 [OUO].	Plowshare	Surrey	General, PAC
Plowshare Advisory Committee	1963	04/04	Plowshare Advisory Committee, Report on the Tenth Meeting. Meeting held at U.S. Atomic Energy Commission, Washington, D.C., April 3-4. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029 [OUO].	Plowshare		General, PAC
Plowshare Advisory Committee	1963	10/29	Plowshare Advisory Committee Meeting. Agenda from Plowshare Advisory Committee, October 28-29. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Carryall, Hansom	
Plowshare Advisory Committee	1963	10/29	Plowshare Advisory Committee, Report on Eleventh Meeting. Meeting held at Lawrence Radiation Laboratory, Livermore, CA, October 28-29. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Carryall, Hansom	General, PAC

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Plowshare Advisory Committee	1964	06/16	Plowshare Advisory Committee Meeting, Report on the Twelfth Meeting. Meeting held at Lawrence Radiation Laboratory, Livermore, CA, April 14. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029 [OUO].	Plowshare		General, PAC
Plowshare Advisory Committee	1965	01/13	Plowshare Advisory Committee, Report on Thirteenth Meeting. Meeting held at Lawrence Radiation Laboratory, Livermore, CA, January 12-13. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029 [OUO].	Plowshare	Carryall, Copper Recovery, Tennessee-Tombigbee Waterway, Copper Flat	General, PAC
Plowshare Advisory Committee	1965	11/10	Plowshare Advisory Committee, Report on Fourteenth Meeting. Meeting held at Lawrence Radiation Laboratory, Livermore, CA, November 9-10. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029 [OUO].	Plowshare	Carryall, Pre-Schooner II	General, PAC
Plowshare Advisory Committee	1966	11/02	Plowshare Advisory Committee, Report on Fifteenth Meeting. Meeting held at U.S. Atomic Energy Commission, Washington, D.C., November 1-2, 1966. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029 [OUO].	Plowshare		General, PAC
Plowshare Advisory Committee	1967	10/11	Plowshare Advisory Committee, Report of Sixteenth Meeting. Meeting held at Lawrence Radiation Laboratory, Livermore, CA, October 10-11. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029 [OUO].	Plowshare	Ketch, Sloop	General, PAC
Plowshare Advisory Committee	1968	04/16	Plowshare Advisory Committee, Report on Seventeenth Meeting. Meeting held at U.S. Atomic Energy Commission, Nevada Operations Office, Las Vegas, NV, April 15-16. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029 [OUO].	Plowshare	Ketch	General, PAC
Plowshare Advisory Committee	1968	11/22	Plowshare Advisory Committee, Report on Eighteenth Meeting. Meeting held at Oak Ridge National Laboratory, Oak Ridge, TN, November 21-22. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029 [OUO].	Plowshare	Bronco, Sloop	General, PAC
Plowshare Advisory Committee	1969	11/05	Plowshare Advisory Committee, Report on Nineteenth Meeting. Meeting held at Lawrence Radiation Laboratory, Livermore, CA, November 4-5. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029 [OUO].	Plowshare	Bronco, Dragon Trail, Ketch, Sloop, Utah, Wagon Wheel Wasp	General, PAC

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Plowshare Advisory Committee	1970	06/18	Plowshare Advisory Committee, Report on Twentieth Meeting. Meeting held at Los Alamos Scientific Laboratory, Los Alamos, NM, June 17-18, 1970. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029 [OUO].	Plowshare		General, PAC
Plowshare Advisory Committee	1971	04/29	Plowshare Advisory Committee, Report on Twenty-First Meeting. Meeting held at U.S. Atomic Energy Commission Offices, Washington, D.C., April 28-29. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029 [OUO].	Plowshare	Wagon Wheel	General, PAC
Plowshare Bibliography	1964	02/00	Plowshare Bibliography. Bibliography of Unclassified Literature, February. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-026.	Plowshare		General, Reference
Plowshare Bibliography	1964	05/00	Plowshare Bibliography. Bibliography of Unclassified Literature, May. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-031.	Plowshare		General, Reference
Plowshare Chronology	1970	07/00	Plowshare Chronology. Table, July. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029 and PLO-031.	Plowshare		General, Reference
Plowshare Program			Major Areas Studied by US Plowshare Program. Table. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-031.	Plowshare		General, Reference
Plowshare Projects	[1973]		Plowshare Projects. Table. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		General, Reference
Plowshare Public Health Evaluation			Plowshare Public Health Evaluation. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0316824.	Plowshare	Bronco, Dragon Trail, Sloop	
PNE Summary	[1974]		PNE Summary. Manuscript. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0183609.	Plowshare		General, Summary
Polatty, J. M., B. J. Houston, R. L. Stowe, and D. C. Banks	1965	02/00	Investigation of Manufacture of Aggregate and Riprap by Nuclear Means. U.S. Army Engineer Waterways Experiment Station, Report PNE-5003, February. Vicksburg, MS. On file at: Defense Threat Reduction Information Analysis Center, Albuquerque, NM.	Plowshare		Mining, Aggregate
Poll, Charles M.	1964	08/28	Letter from Charles M. Poll, The Ralph M. Parsons Company, to Gerald W. Johnson, August 28. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-078.	Plowshare	NAWAPA	

AUTHOR	YEAR	MONTH/ DAY	TITLE AND DOCUMENT SOURCE	PROGRAM	PROJECT(S)	OTHER
Poor, James G.	1975	10/14	"IAEA PNE Advisory Group." Memo from James G. Poor, U.S. Energy Research and Development Administration, to Administrator, thru A. S. Starbird, October 14. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-028.	Plowshare		General, IAEA
Post, Roy G.	1970	05/00	Project Aquarius: Control of Radioisotopes and Safety. In <i>Symposium on Engineering with Nuclear Explosives: Proceedings</i> , Report CONF-700101, Vol. 2, pp. 1174-1183, May. American Nuclear Society, Hinsdale, IL.	Plowshare	Aquarius	
Post, Roy G.	1970	05/00	Project Aquarius - Control of Radioisotopes and Safety. In <i>Symposium on Engineering with Nuclear Explosives: Summaries</i> , p.84, May. American Nuclear Society, Hinsdale, IL.	Plowshare	Aquarius	
Post-Times-Herald	1964	05/02	Water for North America. <i>Post-Times-Herald</i> , May 2. Washington, D.C.	Plowshare	NAWAPA	
Potts, J. Calvin	1959	10/14	Memo with Encl. (Plowshare Advisory Committee Membership) from Calvin Potts, U.S. Atomic Energy Commission, to Distribution, October 14. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		General, PAC
Power, Dean V.	1966	10/17	Intermediate Range and Special Structures Seismic Measurements: Pre-Gondola Seismic Site Calibration Series. Manuscript, University of California, Lawrence Radiation Laboratory, October 17. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA (cover page only).	Plowshare	Pre-Gondola	
Power, Dean V.	1967	07/00	Project Pre-Gondola I, Intermediate Range Ground Motions. Lawrence Radiation Laboratory, Report PNE 1105, July. Livermore, CA. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA (cover page only).	Plowshare	Pre-Gondola	
Power, Dean V.	1969	04/08	Preliminary "Pinedale" Seismic Safety Evaluation. Manuscript, El Paso Natural Gas Company Nuclear Group, El Paso, TX, April 8. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-032.	Plowshare	Wagon Wheel	
Power, Dean V.	1971	12/31	Ground Motion Predictions. In Project Wagon Wheel: Technical Studies Report, El Paso Natural Gas Company, editor, pp. 217-237. El Paso Natural Gas Company, Report PNE-WW-1, December 31. El Paso, TX. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Wagon Wheel	

AUTHOR	YEAR	MONTH/ DAY	TITLE AND DOCUMENT SOURCE	PROGRAM	PROJECT(S)	OTHER
Power, Dean V.	1972	10/01	Predicted Effects of Ground Motion: Project Wagon Wheel. In Project Wagon Wheel: Technical Studies Report Number Two, Leo A. Rogers, editor, pp. B1-B7. El Paso Natural Gas Company, Report PNE-WW-13, October 1. El Paso, TX. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Wagon Wheel	
Power, Dean V.	1972	10/01	Predicted Ground Motions: Project Wagon Wheel, In Project Wagon Wheel: Technical Studies Report Number Two, Leo A. Rogers, editor, pp. A1-A15. El Paso Natural Gas Company, Report PNE-WW-13, October 1. El Paso, TX. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Wagon Wheel	
Pratt, H. R., R. M. Griffin, and A. D. Black	1971	12/31	Rock Mechanics on Wagon Wheel Sandstone. In Project Wagon Wheel: Technical Studies Report, El Paso Natural Gas Company, editor, pp. 79-100. El Paso Natural Gas Company, Report PNE-WW-1, December 31. El Paso, TX. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Wagon Wheel	
Pre-Gnome Operational Plan	1959	01/23	Pre-Gnome Operational Plan. Manuscript, January 23. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0015503.	Plowshare	Pre-Gnome	
Pre-Gondola Craters	1966	11/04	Pre-Gondola Craters. Labeled Photo, November 4. On file at: Fort Peck Archives, U.S. Army Corps of Engineers, Fort Peck, MT, Box 935.	Plowshare	Pre-Gondola	
Pre-Gondola III, Phase I-II	1968	07/09	Pre-Gondola III, Phase I-II. Notes, July 9. On file at: Fort Peck Archives, U.S. Army Corps of Engineers, Fort Peck, MT, Box 825.	Plowshare	Pre-Gondola	
Prentice, H. C..	1964	04/23	Application of Nuclear Explosives for a Mountain Pass Highway and Railroad. In <i>Engineering with Nuclear Explosives, Proceedings of the Third Plowshare Symposium</i> , April 21-23, University of California, Lawrence Radiation Laboratory, Report TID-7695, pp. 309-319. Livermore, CA.	Plowshare	Carryall	
Prentice, H. C., and E. J. L. Peterson, Jr.	1964	01/00	Construction and Feasibility Associated with Nuclear Excavation. In Symposium on Nuclear Excavation Abridgments presented at the 43rd Annual Meeting of the Highway Research Board, National Academy of Sciences - National Research Council, Washington, D.C., January, pp. 21-24. University of California, Lawrence Radiation Laboratory, Report UCRL-7632. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-034.	Plowshare	Carryall	
Press-Chronicle	1964	05/05	Thinking Big on Water. <i>Press-Chronicle</i> , May 5. Johnson City, TN.	Plowshare	NAWAPA	

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Preston, R. G.	1961	01/30	Predicted Phenomenology and Effects for Project Dribble Test Detonations Vela-UNIFORM Explosion Series: Progress Report No. 1. Manuscript (UOPAC-61-27), Lawrence Radiation Laboratory, Livermore, CA, January 30. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Vela Uniform	Cowboy, Dribble	
Preston, R. G.	1969	10/30	"Some Aspects of the Problem Involved in Predicting Damage to Residential-Type Structures from Underground Nuclear Explosions." Memo from R. G. Preston, Lawrence Radiation Laboratory, to the Record, October 30. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-103.	Plowshare		General, Technical
Preston, R. G., and W. M. Adams	1961	05/09	"Planning Directive (VU10-10-61) AEC Vela Uniform." Memo from James E. Reeves, U.S. Atomic Energy Commission, to List, October 23. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Vela Uniform	Cowboy, Dribble	
Progress	1968	04/15	Con-Con, Ketch, Candidates Aired. <i>Progress</i> , April 15. Clearfield, PA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Ketch	
Progress	1968	04/16	WSPX-TV to Air Public Forum on Project Ketch Tonight. <i>Progress</i> , April 16. Clearfield, PA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Ketch	
Progress	1968	06/17	Penn State Channel to Air Project Ketch. <i>Progress</i> , June 17. Clearfield, PA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Ketch	
Project Carryall			Project Carryall. Report. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Carryall	
Project Carryall Time Schedule	[1964]		"Project Carryall Time Schedule." Drawing (graph). On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Carryall	
Project Gondola	[1968]		"Project Gondola Potential Sites in the Western United States." Map. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0186947.	Plowshare	Gondola	
Project Plowboy	1960		Project Plowboy (Special Projects). Manuscript. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV064320.	Plowshare	Plowboy, Hobo	
Project Pre-Gondola	1966	06/17	Project Pre-Gondola. Manuscript, June 17. On file at: Fort Peck Archives, U.S. Army Corps of Engineers, Fort Peck, MT, Box 917.	Plowshare	Pre-Gondola	

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Project Sloop Notes	[1967]		Project Sloop Notes. Notes. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0162244.	Plowshare	Sloop	
Pyle, Jay C., and Jack A. Hadfield	1979	01/00	Hard Flush Aircraft Shelter Test Data Analysis (Dice Throw Test). Report to Defense Nuclear Agency, Washington, D.C.; and Air Force Weapons Laboratory, Report AFWL-TR-78-31, Kirtland Air Force Base, NM, from Boeing Aerospace Company, Seattle, WA, January.		Dice Throw	
Quade, M. N.	1964	07/27	"Pahute Mesa Emplacement Holes 48" Casing Design - Request for Proposal." Letter from M. N. Quade, Parsons, Brinckerhoff, Quade & Douglas, to U.S. Atomic Energy Commission, Nevada Operations Office, July 27.	Plowshare		General, Correspondence
Quong, R., and W. J. LaGuardia	1971	12/31	Permeability of Gas Reservoir Specimens. In Project Wagon Wheel: Technical Studies Report, El Paso Natural Gas Company, editor, pp. 125-126. El Paso Natural Gas Company, Report PNE-WW-1, December 31. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Wagon Wheel	
Rabb, David D.	1961	05/01	Letter from David D. Rabb, Plowshare Division, Lawrence Radiation Laboratory, to Russell J. Cameron, May 1. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-105.	Plowshare	Vintage	
Rabb, David D.	1963	10/08	Letter from David D. Rabb, Lawrence Radiation Laboratory, to T. B. Trent, October 8. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Idaho Phosphates	
Rabb, David D.	1964	01/21	"Plowshare Mining Prospect - Miami Copper Company." Memo from David D. Rabb, Lawrence Radiation Laboratory, to Hansom Committee, January 21. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-085.	Plowshare	Copper Recovery, Cactus Ore	
Rabb, David D.	1964	01/28	Memo from David D. Rabb, Lawrence Radiation Laboratory, to Record/Hansom Group, January 28. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-085.	Plowshare	Molybdenite Recovery	
Rabb, David D.	1964	02/03	"Plowshare Mining Prospect - Kennecott Copper Corporation." Memo from David D. Rabb, Lawrence Radiation Laboratory, to Hansom Committee, February 3. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-085.	Plowshare	Sloop	

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Rabb, David D.	1964	02/25	"Tour of Copper Mining Leaching-In-Place Sites." Memo from David D. Rabb, Lawrence Radiation Laboratory, to Distribution, February 25. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-085.	Plowshare	Copper Recovery, Sloop	
Rabb, David D.	1964	06/09	"The Buttes Reservoir Site." Memo from David D. Rabb, Lawrence Radiation Laboratory, to Hansom Committee, June 9. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-109 and PLO-086.	Plowshare	Copper Recovery, Buttes Reservoir	
Rabb, David D.	1964	06/17	Memo from David D. Rabb, Lawrence Radiation Laboratory, to Hansom Group, June 17. On file at: Archives and Research, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-086.	Plowshare	Copper Recovery	
Rabb, David D.	1964	10/16	"Brief on Copper Flats." Memo from David D. Rabb, Lawrence Radiation Laboratory, to Record, October 16. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-086.	Plowshare	Copper Recovery, Copper Flat	
Rabb, David D.	1964	12/04	Memo from David D. Rabb, Lawrence Radiation Laboratory, for Record, December 4. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	San Luis Dam	General, Correspondence
Rabb, David D.	1965	02/19	"Photos of Subsidence Areas." Memo from David D. Rabb, Lawrence Radiation Laboratory, to Record, February 19. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-102.	Plowshare	Copper Recovery	Applications, Mining
Rabb, David D.	1965	05/08	Atomic Energy for Mining; presented at the Tenth Annual Minerals Symposium, Grand Junction, Colorado, May 7-8, 1965. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-14197-T</i> , May 8. Livermore, CA. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Copper Recovery(?)	Applications, Mining
Rabb, David D.	1965	09/23	Effects for Nuclear Explosions on Gas Well Head and Gas Field Equipment. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-14429</i> , September 23. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-093.	Plowshare		Applications, Gas
Rabb, David D.	1966	03/22	"USBM - USAEC Plowshare Progress Review Meeting in Denver, March 1-2; Trip Report." Memo from David D. Rabb, Lawrence Radiation Laboratory, to Distribution, March 22. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-101.	Plowshare	Copper Recovery, Oil, Others	General

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Rabb, David D.	1966	07/15	Plowshare Program, October 1, 1965 – July 15, 1966, Vol. II, No. 2. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-50008-66-1</i> , July 15. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Bronco, Ketch, Payette, Pre-Schooner, Sloop	General, Quarterly
Rabb, David D.	1966	08/02	"Copper Production Methods." Memo from David D. Rabb, Lawrence Radiation Laboratory, to Records, August 2. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-087.	Plowshare	Copper Recovery	
Rabb, David D.	1966	10/31	Plowshare Program, July 16, 1966 – October 31, 1966, Vol. II, No. 3. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-50008-66-2</i> , October 31. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Bronco, Bo-Peep, Ketch, Pre-Gondola, Sloop	General, Quarterly
Rabb, David D.	1967	01/31	Plowshare Program, November 1, 1966 - January 31, 1967, Vol. II. No. 4. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-50008-66-4</i> , January 31. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Bronco	General, Quarterly
Rabb, David D.	1967	04/30	Plowshare Program February 1, 1967 – April 30, 1967, Vol. II, No. 5. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-50008-67-2</i> , April 30. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Bronco, Dragon Trail, Ketch, Pre-Gondola, Sloop	General, Quarterly
Rabb, David D.	1967	07/31	Plowshare Program May 1, 1967 – July 31, 1967, Vol. II, No. 6. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-50008-67-3</i> , July 31. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Bronco, Buchanan, Travois	General, Quarterly
Rabb, David D.	1967	10/31	Plowshare Program August 1, 1967 - October 31, 1967, Vol. II, No. 7. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-50008-67-4</i> , October 31. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Ketch	General, Quarterly
Rabb, David D.	1968	01/31	Plowshare Program November 1, 1967 – January 31, 1968, Vol. II, No. 8. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-50008-68-1</i> , January 31. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Bronco, Dragon Trail	General, Quarterly

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Rabb, David D.	1968	04/26	Memo from David D. Rabb, Lawrence Radiation Laboratory, to Record / G. Higgins, April 26. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-061.	Plowshare	Sloop	
Rabb, David D.	1968	04/30	Plowshare Program February 1, 1968 – April 30, 1968, Vol. II, No. 1. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-50008-68-2</i> , April 30. Livermore, CA. On file at Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Bronco	General, Quarterly
Rabb, David D.	1968	07/31	Plowshare Program, May 1, 1968 – July 31, 1968, Vol. II, No. 1. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-50008-68-3</i> , July 31. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030 [OUO].	Plowshare	Aquarius, Ketch, Travois	General, Quarterly
Rabb, David D.	1968	08/06	Letter from David D. Rabb, Lawrence Radiation Laboratory, to K. E. Niermeyer, August 6. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-061.	Plowshare	Sloop	
Rabb, David D.	1968	10/25	"Selected Copper Deposits." Memo from David D. Rabb, Lawrence Radiation Laboratory, to Gary H. Higgins, October 25. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-087.	Plowshare	Copper Recovery	
Rabb, David D.	1968	10/31	Plowshare Program, August 1, 1968 - October 31, 1968, Vol. III, No. 1. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-50008-68-4</i> , October 31. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare		General, Quarterly
Rabb, David D.	1969	01/31	Plowshare Program, November 1, 1968 - January 31, 1969, Vol. III, No. 2. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-50008-69-1</i> , January 31. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare		General, Quarterly
Rabb, David D.	1969	02/03	Letter from David D. Rabb, Lawrence Radiation Laboratory, to Paul C. Trussell, February 3. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-061.	Plowshare	Sloop	

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Rabb, David D., and D. Snoeberger	1968	04/01	"Gold Leaching." Memo from D. D. Rabb and D. Snoeberger, Lawrence Radiation Laboratory, to Record, April 1. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-098.	Plowshare	Gold Leaching	
Rabb, David D., and D. Snoeberger	1968	04/09	"Visit by Dow Chemical Company Personnel." Memo from D. Rabb and D. Snoeberger, Lawrence Radiation Laboratory, to Distribution, April 9. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-098.	Plowshare	Gold Leaching	
Ralph Parsons Engineering Company	1964	07/07	NAWAPA, North American Water and Power Alliance, Summary Report for New Mexico. Manuscript, Ralph M. Parsons Company, July 7. Los Angeles, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-078.	Plowshare	NAWAPA	
Ralph Parsons Engineering Company	1964	07/28	NAWAPA, North American Water and Power Alliance, Summary Report for U.S. Atomic Energy Commission Nuclear Applications. Manuscript, Ralph M. Parsons Company, July 28. Los Angeles, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-078.	Plowshare	NAWAPA	
Ramsey, Norman F.	1972	02/22	Letter from Norman F. Ramsey, Harvard University, Department of Physics, to Carl Gerber, February 22. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-028.	Plowshare		General, GAC
Ramspott, L. D.	1968	10/29	Possible Sites for Cratering Experiments, Area 20, NTS. Memo from L. D. Ramspott, Lawrence Radiation Laboratory, to C. E. Williams, October 29. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-072.	Plowshare	Phaeton	
Ramspott, L. D.	1968	11/18	"Yawl and Phaeton Location: Technical Considerations." Memo from L. D. Ramspott, Lawrence Livermore National Laboratory, to Distribution, November 18. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-072.	Plowshare	Phaeton, Yawl	
Ramspott, L. D.	1969	01/24	Potential Saturated-Rock Sites for Yawl and Phaeton. Memo from L. D. Ramspott, Lawrence Radiation Laboratory, to J. A. Krover, January 24. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-072.	Plowshare	Phaeton, Yawl	
Ramspott, L. D.	1969	02/13	"YAWL Exploration." Memo from L. D. Ramspott, Lawrence Radiation Laboratory, to J. A. Krover, February 13. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-072.	Plowshare	Yawl	

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Ramspott, L. D.	1969	07/14	"Location of Yawl Emplacement Hole." Memo from L. D. Ramspott, Lawrence Radiation Laboratory, to Distribution, July 14. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-072 [OUO].	Plowshare	Yawl	
Ranchers Exploration & Development Corporation	1972		The Old Reliable Project. Manuscript, Ranchers Exploration and Development Corporation, Albuquerque, NM. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-087.	Plowshare(?)	Old Reliable Mine	
Randolph, Philip L.	1970	09/25	Letter with Encl. (Economics of Nuclear Stimulation, comments on draft UCRL-72725) from Philip L. Randolph, El Paso Natural Gas Company, El Paso, TX, to Glenn C. Werth, September 25. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-094.	Plowshare		General, Economics
Randolph, Philip L.	1970	11/10	Gas Storage Application of Peaceful Nuclear Explosions. Paper for presentation at the IAEA Panel on the Peaceful Uses of Nuclear Explosives, January 18-21, 1971. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-095.	Plowshare	Red Lake	
Randolph, Philip L.	1972	02/24	Letter from Philip L. Randolph, El Paso Natural Gas Company, El Paso, TX, to Glenn C. Werth, February 24. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-087.	Plowshare(?)	Old Reliable Mine	
Rappleyea, C. Annette	1967	04/00	Crater, Ejecta, and Air-Blast Studies from Five High-Explosive Charges in a Horizontal Square Array. Report to U.S. Atomic Energy Commission, Report TID-4500, Nuclear Explosions - Peaceful Applications. Washington, D.C. On file at: Defense Threat Reduction Information Analysis Center, Albuquerque, NM.	Plowshare	Tonopah 211	Phenomenology
Rawson, D. E.	1960	12/10	Drilling into Molten Lava in the Kilauea Iki Volcanic Crater, Hawaii. <i>Nature</i> , Vol. 188, pp. 930-931, December 10.	Plowshare	Iki	

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Rawson, Don	1967	07/31	"Preliminary Information on Pinedale from EPNG Geologists." Memo from Don Rawson, Lawrence Radiation Laboratory, to Distribution, July 31. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-067.	Plowshare	Wagon Wheel	
Rawson, Donald E.	1966	07/00	Industrial Applications of Contained Nuclear Explosions. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-14756</i> , July. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-103 and PLO-104.	Plowshare		Applications, Mining, Gas Stimulation, Oil, Tar Sand, Copper, Caving, Storage, Water Resource, Geothermal, Power Storage
Rawson, Donald E., and Walter P. Bennett	1961	03/24	Results and Power Generation Implications from Drilling into the Kilauea Iki Lava Lake, Hawaii. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-6374</i> , March 24. Livermore, CA.	Plowshare	Iki	
Rawson, D. E., R. W. Taylor, and D. L. Springer	1967		Review of the Salmon Experiment: A Nuclear Explosion in Salt. <i>Die Naturwissenschaften</i> , Vol. 20, pp. 525-531. Springer-Verlag/Berlin, Heidelberg, New York.	Vela Uniform	Dribble, Salmon	
Read, Charles B.	1958	04/16	"Site for Plowshare Experiment in Salt." Letter from Charles B. Read to Gerald W. Johnson, April 16. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Nuclear Explosive Power Generation	
Reagan, Ronald	1969	04/15	Letter with response (Michael M. May to Ronald Reagan, March 7) from Governor Ronald Reagan, State of California, to Michael M. May, April 15. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-027.	Plowshare		General
Reakes, R. G., J. Newson, W. H. Frye, and A. S. Child	1966	07/15	Long Range Seismic Measurements - Chase V, 24 May 1966. Report to Air Force Technical Applications Center, Washington, D.C., from Teledyne Industries, Geotech Division, Garland, TX, July 15. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.	Vela Uniform	CHASE V	

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Redpath, Bruce B.	1972	01/00	Project Pre-Gondola III, Phase III: Connection of a Row Crater to a Reservoir. U.S. Army Nuclear Cratering Group, Report PNE 1120, January. Livermore, CA. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA; and Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Pre-Gondola	
Redpath, Bruce B.	1972	07/00	Project Trinidad: Explosive Excavation Tests in Sandstone and Shale. U.S. Army Engineer Waterways Experiment Station Explosive Excavation Research Laboratory, Technical Report No. E-73-1 (Revised), July. Livermore, CA. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0330826.	Plowshare	Trinidad	
Reed, Jack W.	1971	01/00	Project Pre-Gondola III Phase III, Connection of a Row Crater to a Reservoir. Lawrence Radiation Laboratory, U.S. Army Engineer Nuclear Cratering Group, Report PNE 1120, January. Livermore, CA. Note: Document Location?	Plowshare	Pre-Gondola	
Reed, Jack W.	1971	06/00	Project Pre-Gondola III, Phase II, Microbarograph Measurements. Lawrence Radiation Laboratory, U.S. Army Engineer Nuclear Cratering Group, Report PNE 1118, June. Livermore, CA. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA (cover page and references only).	Plowshare	Pre-Gondola	
Reed, John W.	1974	10/00	Dynamic Response Reconciliation of Residential Structures: Project Trinidad. John A. Blume & Associates, Engineers, Report No. JAB-99-110, October 1974, San Francisco, CA. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Trinidad	
Reeves, James E.	1959	09/25	"Operations Order 3-59 - Project Cowboy." Memo from James E. Reeves, U.S. Atomic Energy Commission, Albuquerque Operations Office, to Distribution, September 25. On file at Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Accession No. NV0069240.	Vela Uniform	Cowboy	

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Reeves, James E.	1960	02/10	"Operations Order 3-59 - Project Cowboy (Revision)." Memo from James E. Reeves, Atomic Energy Commission, Albuquerque Office, to Distribution, February 10. On file at: Nuclear Testing Archive, Nevada Operations Office, National Nuclear Security Administration, Las Vegas, NV, Accession No. NV0064489.	Vela Uniform	Cowboy	
Reeves, James E.	1960	04/29	"Operations Order OTO-2-60 - Project Pinot." Memo from James E. Reeves, U.S. Atomic Energy Commission, Albuquerque Office, to Distribution, April 29. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-032.	Plowshare	Pinot	
Reeves, James E.	1961	03/17	"Glossary of Seismic Projects, Plowshare Program, and Reactor Programs." Memo from James E. Reeves, U.S. Atomic Energy Commission, Albuquerque Office, to List, March 17. On file at Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV [OUO].	Plowshare, Vela Uniform	Cowboy, Dribble, Groundhog, Pinot, Subway, Vaquero, Winnow, Wagon	General
Reeves, James E.	1961	10/23	"Planning Directive (VU10-10-61) AEC Vela Uniform." Memo from James E. Reeves, U.S. Atomic Energy Commission, to List, October 23. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Vela Uniform	Dribble, Groundhog	
Reeves, James E.	1961	12/20	"Planning Directive (PL-5-12-61), Project Wagon and Buckboard II." Memo from James E. Reeves, U.S. Atomic Energy Commission, Albuquerque Office, to Those Listed Below, December 20. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-066.	Plowshare	Wagon	
Reeves, James E.	1962	01/22	"Glossary of Unclassified Terms - OFO Programs." Memo from James E. Reeves, U.S. Atomic Energy Commission, Albuquerque Office, to List, January 22. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV [OUO].	Vela Uniform	Dribble	General
Reeves, James E.	1963	08/27	Telex from James E. Reeves, U.S. Atomic Energy Commission, Nevada Operations Office, to George S. Groves, August 27. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Argo Tunnel	

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Reeves, James E.	1966	03/03	"Addendum to Planning Directive (VU-4-9-62), Station 1A, Re-Entry Project Dribble (Revision No. 1)." Memo from James E. Reeves, U.S. Atomic Energy Commission, Nevada Operations Office, to List, March 3. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Vela Uniform	Dribble, Salmon	
Reeves, James E.	1966	07/01	Letter from James E. Reeves, U.S. Atomic Energy Commission, Nevada Operations Office, to G. C. Werth, July 1. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-031 [OUO].	Vela Uniform	Payette	
Reeves, James E.	1966	08/29	Telex from James E. Reeves, U.S. Atomic Energy Commission, Nevada Operations Office, to J. Barton, August 29. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-031.	Vela Uniform	Payette	
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Reeves, James E.	1967	06/12	"Off-Site Radiological Safety Criteria for Project Cabriolet." Memo with Encl. ("Revised Page 2, Cabriolet Operation Plan") from James E. Reeves, U.S. Atomic Energy Commission, Nevada Operations Office, to John S. Kelly, June 12. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0016517.	Plowshare	Cabriolet	
Reeves, James E.	1967	12/05	"ARPA Work Authorization No. 5 - Project Payette, Feasibility Studies - Phase I." Memo from James E. Reeves, U.S. Atomic Energy Commission, Nevada Operations Office, to William D. Smith, Jr., December 5. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-031.	Vela Uniform	Payette	

AUTHOR	YEAR	MONTH/ DAY	TITLE AND DOCUMENT SOURCE	PROGRAM	PROJECT(S)	OTHER
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Reeves, James E.	1968	03/23	Telex from James E. Reeves, U.S. Atomic Energy Commission, Nevada Operations Office, to E. B. Giller, Brig. Gen., March 23. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-031.	Vela Uniform	Payette	
Reeves, James E.	1968	04/23	Telex from James E. Reeves, U.S. Atomic Energy Commission, Nevada Operations Office, to E. B. Giller, Brig. Gen., April 23. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-031.	Vela Uniform	Payette	
Reeves, James E.	1968	05/31	Letter from James E. Reeves, U.S. Atomic Energy Commission, Nevada Operations Office to Lt. Col B. C. Hughes, May 31. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-065.	Plowshare	Travois	
Reeves, James E.	1968	10/18	Letter from James E. Reeves, U.S. Atomic Energy Commission, Nevada Operations Office, to Michael M. May, October 18. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-061.	Plowshare	Sloop	
Reeves, James E.	1968	11/05	"Summary Minutes of Gondola Site Selection Committee Meeting." Memo with Encls (Summary Minutes - Gondola Site Selection Committee Meeting of October 8, 1968 and Gondola Site Selection Committee Meeting Attendees, October 8, 1968) from James E. Reeves, U.S. Atomic Energy Commission, Nevada Operations Office, to John S. Kelly, November 5. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0038201.	Plowshare	Gondola	
Reeves, James E.	1968	11/14	"Planning directive for Gondola Site Selection, PL-2-11-68." Memo from James E. Reeves, U.S. Atomic Energy Commission, Nevada Operations Office, to List, November 14. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0038200.	Plowshare	Gondola	

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Reeves, James E., and H. L. Ryland	1960	05/20	" Project Engineer's Weekly Activity Report - April 28 thru May 6, 1960." Letter from James E. Reeves and H. L. Hyland, U.S. Atomic Energy Commission, Albuquerque Office, May 20. On file at Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0069340.	Plowshare	Pinot	
Regents of the University of California	1959	08/21	"Subcontract 122, Project Agreement No. 19." Contract between Regents of the University of California and Stanford Research Institute, August 21. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900157, 4/18.	Plowshare	San Clemente Island	
Regnier, John E.	1970	05/25	"Telephone Call From Paul Smith, 5/25/70." Memo from John E. Regnier, U.S. Department of Health, Education, and Welfare, Southwestern Radiological Health Laboratory, to ODC:JER, May 25. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0173138.	Plowshare	Geothermal Power	
Renfro, H. B.	1967	08/18	"Plowshare Committee, Atomic Industrial Forum." Memo from H. B. Renfro to G. Werth, August 18.	Plowshare	Bronco, Dragon Trail, Ketch, Gasbuggy, Sloop, Rulison	
Reistrup, J. V.	1967	04/28	Teller Calls for A-Blast on the Moon. <i>Washington Post</i> , April 28. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare		General
Renick, J. D.	1977	02/01	Middle North Series: Pre-Dice Throw II Event, Near Ground Motion Measurements. Report to Defense Nuclear Agency, Washington, D.C., from Air Force Weapons Laboratory, Kirtland Air Force Base, NM, February 1. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.		Pre-Dice Throw	
Renovo Daily Record	1968	01/31	Physicist Agrees with Local Man in Opposition to Project Ketch. <i>Renovo Daily Record</i> , January 31. Renovo, PA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Ketch	

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Renovo Daily Record	1968	04/15	Benny Says. <i>Renovo Daily Record</i> , April 15. Renovo, PA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Ketch	
Renovo Daily Record	1968	04/17	Local Men Plan to Attend Forum on Project Ketch. <i>Renovo Daily Record</i> , April 17. Renovo, PA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Ketch	
Renovo Daily Record	1968	04/18	Benny Says. <i>Renovo Daily Record</i> , April 18. Renovo, PA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Ketch	
Renovo Daily Record	1968	06/12	Goddard Acknowledges Ketch Petition Receipt. <i>Renovo Daily Record</i> , June 12. Renovo, PA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Ketch	
Renovo Daily Record	1968	06/19	Benny Says. <i>Renovo Daily Record</i> , June 19. Renovo, PA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Ketch	
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Reston, James B.	1958	03/14	How a 'Tiny' Bomb Moved a Mountain and Got Lost. <i>Chronicle</i> , March 14. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		General
Reynolds Electrical & Engineering Co., Inc.	1961	03/28	General Support Plan and Signal Facilities, Project Wagon. Report to U.S. Atomic Energy Commission (Contract AT 29-2-162), from Reynolds Electrical & Engineering Co., Inc., Las Vegas, NV, March 28. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Wagon	
Reynolds, Harry L.	1968	06/26	"TRAVOIS - Comments on SDK 68-24." Memo from Harry L. Reynolds, Lawrence Radiation Laboratory, to Glenn Werth, June 26. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-065.	Plowshare	Excavator, Travois	

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Reynolds, Harry L.	1971	01/20	Letter with Encl. (Program Outline: A Study of Cratering and Hole Stemming) from Harry L. Reynolds, Lawrence Radiation Laboratory, to Maj. Gen. Edward B. Giller, January 20. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-027.	Plowshare		General, Proposal
Rhodes, Juanita	1965	03/17	Letter from Juanita Rhodes, Saline Valley Conservancy District, to Gerald W. Johnson, March 17. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Saline River Canal	
Richhart, C. L.	1962	11/04	Trinity May Play Heroic Role. <i>Fort Worth Star-Telegram</i> , p. 2, November 4.	Plowshare	Trinity Canal	
Riggs, Stanley R., and Dorothea V. Ames	2007	00/00	Effect of Storms on Barrier Island Dynamics, Core Banks, Cape Lookout National Seashore, North Carolina, 1960-2001. <i>U.S. Geological Survey Scientific Investigations Report 2006-5309</i> .	Plowshare	Drum Inlet	
Rios-Carvajal, J.	1967		Project Carryall. In <i>Puerto Rico Nuclear Center Plowshare Workshop</i> , July 1 - August 15, 1967, Knud B. Pedersen, editor, pp. 92-95. Puerto Rico. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Carryall	
Robertson, F. A.	1973	02/07	"U.S. Patents 3,258,069 and 3,330,356." Letter from F. A. Robertson, U.S. Atomic Energy Commission, San Francisco Office, to John H. Howard, February 2. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-098.	Plowshare	Geothermal Power	
Robinson, James	1964	05/17	Water, \$100 Billion Worth of It. <i>The Miami Herald</i> , May 17.	Plowshare	NAWAPA	
Rodean, H. C.	1967	06/06	Research for Understanding and Constructively Using Underground Nuclear Explosions. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-50276</i> , June 6. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-103. Abstract and Introduction only.	Plowshare		Applications
Rodean, H. C.	1968	03/08	"Payette Review Meeting." Memo (UOPOKA 68-9) from H. C. Rodean, Lawrence Radiation Laboratory, to Distribution, March 8. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-031.	Vela Uniform	Payette	
Rodean, H. C.	1968	07/10	"Payette Meeting at NVOO on July 9, 1968." Memo from H. C. Rodean, Lawrence Radiation Laboratory, to Distribution, July 10. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-031.	Vela Uniform	Payette	

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Rodean, H. C.	1968	10/11	"Payette Meeting at NVOO on October 10, 1968." Memo (UOPKA 68-25) from H. Rodean, Lawrence Radiation Laboratory, to Distribution, October 11. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-031.	Vela Uniform	Payette	
Rodean, H. C.	1969	01/16	"Payette Meeting at NVOO on January 15, 1969." Memo (UOPKA 69-3) from H. Rodean, Lawrence Radiation Laboratory, to Distribution, January 16. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-031.	Vela Uniform	Payette	
Rodean, H. C.	1969	09/11	"Project Payette Meeting at NVOO on September 10, 1969." Memo (UOPKA 69-46) from H. C. Rodean, Lawrence Radiation Laboratory, to Distribution, September 11. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-031.	Vela Uniform	Payette	
Rodean, H. C.	1969	11/19	"November 18, 1969, Payette Meeting." Memo (UOPKA 69-59) from H. C. Rodean, Lawrence Radiation Laboratory, to Distribution, November 19. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-031.	Vela Uniform	Payette	
Rodean, H. C.	1969	12/15	"Memo for Glenn's Trip to Washington on December 17, 1969." Memo with Encl. (Project Payette Final Summary Report) from Howard Rodean to Glenn Werth, December 15. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-031.	Vela Uniform	Payette	
Rodean, H. C.	1971	08/02	Cavity Decoupling of Nuclear Explosions. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-51097</i> , August 2. Livermore, CA. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Vela Uniform	Cowboy, Dribble, Sterling, Salmon, Payette	
Rodean, Howard C.	1971	09/00	Nuclear-Explosion Seismology. U.S. Atomic Energy Commission, Division of Technical Information, September. Springfield, VA.	Vela Uniform		General
Rodgers, P. W.	1973	03/12	"Downward Direction Shooting for Plowshare Gas Stimulation Shots." Memo from P. W. Rodgers, Lawrence Livermore Laboratory, to O. H. Krause, et al., March 12. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-094.	Plowshare		Phenomenology Gas
Rodriguez, Ernest R., and I. J. Ratliff	1960	05/04	Safety Inspection Report: Proposed Project Pinot, United States Atomic Energy Commission, at Oil-Shale Mine, Bureau of Mines near Rifle, Garfield County, Colorado, May 3-4 1960. Manuscript, United States Department of the Interior, Bureau of Mines, Denver, CO. On file at: National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0069346.	Plowshare	Pinot	

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Roos, William F.	1968	05/22	Telex from William F. Roos, District Engineer, U.S. Army Corps of Engineers, Honolulu District, to Director, Nuclear Cratering Group, May 22. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-078 [OUO].	Plowshare	South Point Harbor	
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San Bernardino Sun	1963	06/27	Highways Officials Mum on Peaceful Use of Atom Bomb. <i>San Bernardino Sun</i> , June 27.	Plowshare	Carryall	
San Bernardino Telegram	1963	06/26	A-Blasts May Help Build Desert Roads. <i>San Bernardino Telegram</i> , June 26.	Plowshare	Carryall	
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Seaborg, Glenn T.	1964	05/30	Letter from Glenn T. Seaborg, U.S. Atomic Energy Commission, to The President (Lyndon B. Johnson), May 30. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Las Vegas, NV, Accession No. 0075430.	Vela Uniform	Dribble, Salmon, Sand, Tar	
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Shaffer, Lysle E.	1964	06/15	"Copper." Memo from Lysle Shaffer, Lawrence Radiation Laboratory, to Plowshare Physics K Division, Gary H. Higgins, June 15. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, June 15.	Plowshare	Copper Recovery	
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Shaughnessy, Jack	1971	07/21	Completion Report: Wagon Wheel Water Well No. 2. Report PNE-WW-16, El Paso Natural Gas Company, Farmington, NM, July 21. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0068490.	Plowshare	Wagon Wheel	
Shaughnessy, Jack, and R. H. Butcher	1970	04/00	Project Wagon Wheel: Interim Report of Wagon Wheel No. 1 at Casing Point Depth of 12,106 Feet. Report PNE-WW-15, El Paso Natural Gas Company Northwest Region, April. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Wagon Wheel	
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Shelton, A. V.	1959	07/31	"Transmittal of Technical Director's Operations Plan for Project "COWBOY." Memo with Encl. ("Technical Director's Operations Plan for Project Cowboy") from A. V. Shelton, Lawrence Radiation Laboratory, to Distribution, July 31. On file at: Nuclear Testing Archive, Nevada Site Office, National Nuclear Security Administration, Las Vegas, NV, File NV0069544.	Vela Uniform	Cowboy	
Shelton, A. V.	1960	02/12	"Cowboy Shot Schedule." Memo from A. Vay Shelton, Lawrence Radiation Laboratory, to Distribution, February 12. On file at: Nuclear Testing Archive, Nevada Site Office, National Nuclear Security Administration, Las Vegas, NV, File NV0069381.	Vela Uniform	Cowboy	
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Sherwood, A. E.	1972	11/00	Explosive Stimulation of a Geothermal Steam Reservoir. University of California, Lawrence Livermore National Laboratory, <i>Report UCRL-51303</i> , November. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-036.	Plowshare	Geothermal Power	
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Short, Nicholas M.	1960	10/10	Project Cowboy: Fracturing of Rock Salt by a Contained High Explosive. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-6054</i> , September 10. Livermore, CA.	Vela Uniform, Plowshare	Cowboy, Plowboy	
Shugart, T. R.	1965	05/00	Comparison of Seismic Effects of Salmon Event Versus New Madrid Earthquake of February 2, 1962. Manuscript, U.S. Department of Commerce, Coast and Geodetic Survey, Washington Science Center, Rockville, MD. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV; and Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.	Vela Uniform	New Madrid Earthquake	

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Shute, E. C.	1960	03/29	Telex from E. C. Shute, U.S. Atomic Energy Commission, San Francisco Operations Office, to Brigadier General A. D. Starbird, March 29. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-032 [OUO].	Plowshare	Pinot	
Shute, E. C.	1960	04/12	Telex from E. C. Shute, U.S. Atomic Energy Commission, to U.S. Department of the Interior, Bureau of Mines, April 12. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-032.	Plowshare	Pinot	
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Shute, Ellison C.	1959	01/06	Remarks to U.S. Bureau of Mines - AEC - Petroleum Industry Meeting, Dallas, TX, from Ellison C. Shute, U.S. Atomic Energy Commission, San Francisco Operations Office, January 6. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-106.	Plowshare	Vintage	
Simons, Howard	1966	04/17	Data Fail to Pinpoint Underground Blast. <i>Washington Post</i> , April 17. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Vela Uniform(?)		General
Simpler, L. C.	1965	02/03	Letter from L. C. Simpler, First National Bank in Milton, FL, to Gerald W. Johnson, February 3. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-077.	Plowshare	Miscellaneous	
Sisemore, Clyde	1973	07/19	Analyzing of Surface-Motion Data from Old Reliable Mine Blast. University of California, Lawrence Livermore Laboratory, <i>Report UCID-16314</i> , July 19. Livermore, CA. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0330830.	Plowshare(?)	Old Reliable Mine	
Sisemore, Clyde	1974	10/02	"Estimated Seismic Damage Range for the Caddo Pine Island Project." Memo from Clyde Sisemore, Lawrence Livermore Laboratory, to Distribution. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-106.	Plowshare	Caddo Pine Island	

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Sisemore, Clyde J., Donald E. Burton, and Jon B. Bryan.	1974	08/28	Project Diamond Ore, Phase IIA: Close-In Measurements Program. University of California, Lawrence Livermore Laboratory, <i>Report UCRL-51620</i> , August 28. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-037; and Technical Reports Library, Lawrence Livermore National Laboratory, Livermore CA.		Diamond Ore	
Sisemore, Clyde J., Leo Rogers, and William Perret	1968	11/05	Project Sterling: Subsurface Phenomenology Measurements Near a Decoupled Nuclear Event. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-71407</i> , November 5. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-037.	Vela Uniform	Dribble, Sterling	
Slazak, Walter J.	1964	10/26	"Status Report - Nuclear Explosives Studies for Civil Construction (Reports Control Symbol ENGCW-E-9)." Letter with Encl. ("Status Report, Effective Date: 30 September 1964 - ENGCE-E-9") from Walter J. Slazak, Lawrence Radiation Laboratory, U.S. Army Engineer Nuclear Cratering Group, to Chief of Engineers, Department of the Army, October 26. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Fort Bragg - Eureka Harbor, Camelsback Dam, Steamboat, Zulu	General, NCG
Slazak, Walter J.	1965	01/15	"Status Report - Nuclear Explosives Studies for Civil Construction (Reports Control Symbol ENGCW-E-9)." Memo with Encl. ("Status Report, Effective Date: 31 December 1964 - ENGCE-E-9") from Walter J. Slazak, Lawrence Radiation Laboratory, U.S. Army Engineer Nuclear Cratering Group, to Chief of Engineers, Department of the Army, January 15. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Fort Bragg - Eureka Harbor, Camelsback Dam, Chomly Cutoff, Hawaii Harbor, Kaunakakai, South Point, Pre-Gondola, Steamboat, Tennessee-Tombigbee Waterway, Zulu	General, NCG

AUTHOR	YEAR	MONTH/ DAY	TITLE AND DOCUMENT SOURCE	PROGRAM	PROJECT(S)	OTHER
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Slazak, Walter J.	1965	07/16	Letter from Walter J. Slazak, Lawrence Radiation Laboratory, U.S. Army Engineer Nuclear Cratering Group, to James E. Reeves, July 16. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-065.	Plowshare	Tennessee-Tombigbee Waterway	
Slazak, Walter J.	1966	09/20	Letter with Encl. ("Summary of Possible Quarrying Projects") from Walter J. Slazak, Lt. Colonel, Lawrence Radiation Laboratory, U.S. Army Engineer Nuclear Cratering Group, to Michael M. May, September 20. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Buchanan Dam, Cochiti Dam, Etsel Dam, Travois, Wenaha Dam	
Smeder, O. R.	1968	12/27	"Ice Tanker Test in Arctic Regions." Memo with Encls. (proposed "Operation Plan;" Agreement between the Humble Oil and Refining Company and the Department of Transportation; letter from Humble, October 24; and letter from Secretary Boyd, November 14) from O. R. Smeder, Rear Admiral, U.S. Coast Guard, to Chief of Staff, December 27. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	North Slope Harbor	
Smith, Allan E.	1969	01/17	"Gondola Site Selection." Memo with Encls. (map; letter from Donald E. Edwards to Melvin W. Carter, January 11; and Project Gondola, manuscript) from Allan E. Smith, Staff Officer, Southwest Radiological Health Laboratory, to Melvin W. Carter, January 17. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0038199.	Plowshare	Gondola	
Smith, Donald D.	1973	10/00	Observations on Wildlife and Domestic Animals Exposed to the Ground Motion Effects of Underground Nuclear Detonations. Report to U.S. Atomic Energy Commission from U.S. Environmental Protection Agency, Las Vegas, NV. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-100.	Plowshare		General
Smith, Fred L., and Thomas R. Young	1960	07/00	Nuclear Explosives and Mining Costs. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-5928</i> , July. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Copper Recovery, Sloop	Applications, Mining

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Smith, Sam	1967	09/01	Letter from Sam Smith, El Paso Natural Gas Company, El Paso, TX, to John F. Philip, September 1. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-067.	Plowshare	Wagon Wheel	
Smith, Sam	1968	04/02	Letter from Sam Smith, El Paso Natural Gas Company, El Paso, TX, to John F. Philip, April 2. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-032.	Plowshare	Wagon Wheel	
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Snell, Charles M.	1972	04/00	Shock Wave Interaction and Near-Surface Cavitation, Project Tugboat. U.S. Army Engineer Waterways Experiment Station, Explosive Excavation Research Laboratory, Technical Memorandum, No. EERL/TM 71-17, April. Livermore, CA.	Plowshare	Tugboat	
Snell, Charles M., and Richard H. Gillespie	1973	08/00	Technical Report E-73-5 Project Drum Inlet: Explosive Excavation in Saturated Sand. U.S. Army Engineer Waterways Experiment Station Explosive Excavation Research Laboratory, TID-4500, UC-35, August. Livermore, CA.	Plowshare	Tugboat	
Snell, C. M., Heusinkveld, M., Bryan, J. B., and D. E. Burton	1974	06/23	Progress Report: Controlled Blasting Calculational Studies. University of California, Lawrence Livermore Laboratory, Report UCID-16551, June 23. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-085.			Phenomenology
Snell, C. M., and R. F. Rohrer	1974	10/10	"Preliminary Results of Ejecta Field Program, ESSEX I 12 MU Cratering Event." Memo from C. M. Snell and R. F. Rohrer, Lawrence Livermore Laboratory, to Distribution, October 10. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-092.		ESSEX	
Snoeberger, D. F.	1967	08/08	"Visit to the Dow Research Laboratory, Walnut Creek, re Gold Complexing." Memo from D. F. Snoeberger, Lawrence Radiation Laboratory, to Distribution, August 8. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-098.	Plowshare	Gold Leaching	

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Sohns, H. W.	1971	02/12	Retorting Studies. In <i>Symposium on Oil Shale Retorting and Project Utah</i> , pp. 41-48, Western Oil Shale Corporation, February 17. Laramie, WY. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Utah	
Southwestern Radiological Health Laboratory	1968		Multiple titles - Interim Report of Off-Site Surveillance for the Diana Moon Event of August 27 1968; Interim Report of Off-Site Surveillance for the Dorsal Fin Event of February 29, 1968. Aerial Surveillance Coordination Center Report for the Door Mist Event of August 31, 1967. Department of Health, Education, and Welfare, Public Health Service, National Center for Radiological Health.	Bowline; Crosstie	Diana Moon; Dorsal Fin, Door Mist	
Southwick, Rodney L.	1959	05/08	Press Release, Subject: "Program for the Plowshare Symposium to be conducted May 13 to 15, 1959." San Francisco Operations Office, for release May 8. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		Symposium
Southwick, Rodney L.	1960	04/25	Letter with Encl. (Press Release, Subject: "AEC to Conduct High Explosive Experiment in Colorado Oil Shale Mine," San Francisco Operations Office, for release April 27) from Rodney L. Southwick, Lawrence Radiation Laboratory, to C. L. Fankouser, April 25. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-032.	Plowshare	Pinot	
Southwick, Rodney L.	1963	06/28	"Inquiry on Plowshare - State-LRL Studies." Memo from Rodney L. Southwick, Lawrence Radiation Laboratory, to Those Listed Below, June 28. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-109.	Plowshare	California Water Plan	
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Southwick, Rodney L.	1967	10/12	"State of Arizona Reaction - Sloop." Memo with Encls. (Press Release, Subject: "Statement Regarding Sloop," October 11, and letter from K. R. Geiser, Arizona Atomic Energy Commission, to Governor Jack Williams, October 11) from Rodney L. Southwick, U.S. Atomic Energy Commission, San Francisco Operations Office, to John A. Harris, October 12. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-061.	Plowshare	Sloop	
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Springer, Donald L., and Ross L. Kinnaman	1971	08/00	Seismic Source Summary for U. S. Underground Nuclear Explosions, 1961-1970. <i>Bulletin of the Seismological Society of America</i> , Vol. 6, No. 4, pp. 1073-1098, August. University of California, Lawrence Radiation Laboratory, <i>Preprint UCRL-73036</i> , February 26. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-100.			Seismology
Stanfield, K. E.	1958	12/09	Letter with Encl. ("Possible Sites for 'Vintage' Oil-Shale Test Under the Plowshare Project") from K. E. Stanfield, U.S. Department of the Interior, Bureau of Mines, to Charles E. Violet, December 9. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-105.	Plowshare	Vintage	
Starbird, Alfred D.	1957	01/00	"Power Producing Explosions." Telex from Alfred D. Starbird, Brigadier General, U.S. Atomic Energy Commission, to H. Fidler, January. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900020, 24/26.	Plowshare		Application, Power Production
Starbird, Alfred D.	[1958]		Letter from Alfred D. Starbird, Brigadier General, U.S. Atomic Energy Commission, to Edward Teller. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-105.	Plowshare	Vintage	

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Starbird, Alfred D.	1960	04/22	Telex from Alfred D. Starbird, Brigadier General, U.S. Atomic Energy Commission, to San Francisco Operations Office, April 22. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-032.	Plowshare	Pinot	
Stark, Fortney H. Jr.	1974	03/07	Letter from Fortney H. Stark, Jr., Congress of the United States, House of Representatives, to Roger E. Batzel, March 7. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-027.	Plowshare		General, Correspondence
Star-Tribune	1973	01/30	Economy Cuts Wagon Wheel. <i>Star-Tribune</i> , January 30. Casper, WY. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0189017.	Plowshare	Wagon Wheel	
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Stearns, R. T.	1969	05/14	"Effects Evaluation Report - Yawl Project." Letter from R. T. Stearns, U.S. Atomic Energy Commission, Nevada Operations Office, to Rollin H. Shaw, May 14. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-072.	Plowshare	Yawl	
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Steele, Mary Ann	1972	04/11	Letter from Mary Ann Steele, Wagon Wheel Information Committee, to James R. Schlesinger, April 11. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0076279.	Plowshare	Wagon Wheel	
Stephens, D. R.	1962	07/01	Some Economic Studies of Plowshare Applications. University of California, Lawrence Radiation Laboratory, Report UCRL-6973, July 1. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-034.	Plowshare		Applications, Other

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Stephens, D. R.	1975	05/07	Prospects for In Situ Coal Liquefaction. University of California, Lawrence Livermore Laboratory, <i>Report UCRL-51770</i> , May 7. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-037.			Mining, Coal Liquefaction
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Sterrett, T. S.	1967	10/16	"Recent Visit to Project Dragon Trail Site and the Drilling of DT-B Drill Hole." Memo from T. S. Sterrett, Lawrence Radiation Laboratory, to M.D. Nordyke. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-012.	Plowshare	Dragon Trail	
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Teller, Edward	1963	02/04	Plowshare. University of California, Lawrence Radiation Laboratory <i>Report UCRL-7222</i> , February 4. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Feather River Project, Hawaii Harbor, Iki, Katalla Harbor, Port Moller, Rampart Canyon Dam, Vintage	Applications
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Teller, Edward	1963	04/29	Letter from Edward Teller to Edgar F. Kaiser, April 29. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA. File PLO-109.	Plowshare	California Water Plan	
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Test, H. H.	1967	04/10	Letter from H. H. Test, U.S. Department of Defense, Advanced Research Projects Agency, to C. V. Glines, April 10. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0083881.	Vela Uniform	CHASE VI	
Tewes, H. A.	1967	07/31	"Establishment of a Leaching Task Group." Memo from H. A. Tewes, Lawrence Radiation Laboratory, to J. S. Kahn, July 31. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-087.	Plowshare	Copper Recovery, Sloop	
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Todd, James A.	1972	02/03	Letter from James A. Todd, E. I. Du Pont De Nemours & Co., to Glenn C. Werth, February 3.	Plowshare	Old Reliable Mine	
Toman, John			John Toman, Group Leader Computational Physics, K-Division, University of California, Lawrence Radiation Laboratory. Biographic Sketch. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, Box 71, File 1470.	Plowshare		General, Reference
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Toman, John	1967	05/02	"Project Ketch Post-Shot Programs." Memo from John Toman, Lawrence Radiation Laboratory, to Distribution, May 2. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0162661.	Plowshare	Ketch	
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Toman, John	1970	05/00	Summary of Nuclear-Excavation Applications. In <i>Symposium on Engineering with Nuclear Explosives: Proceedings</i> , Report CONF-700101, Vol. 1, pp. 245-279, May. American Nuclear Society, Hinsdale, IL.	Plowshare	Boca Bypass, Buenaventura/Bogota, California Water Plan, Camelsback Dam, Carryall, Cochiti Dam, Feather River, Nome Harbor, Pre-Gondola, Shemya Island, Travois, Tugboat	
Toman, John	1974	04/01	Letter with Encl. (letter from the Tribune Printing Company, PA, to John Toman, March 22) from John Toman, Lawrence Livermore Laboratory, to Ralph Brown, April 1. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-109.	Plowshare	Radioactive Waste	
Toman, John	1974	04/02	"Initiative to Control Land Use in Colorado." Memo with Encl. (An Initiative for an Act Providing for Goals for Colorado Land Use, and Providing for Implementation Thereof) from John Toman, Lawrence Livermore Laboratory, to Distribution, April 2. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-026.	Plowshare		General, CO Amendment
Toman, John	1974	09/09	"Colorado Amendment #10, Ban on Nuclear Detonations." Memo from J. Toman, Lawrence Livermore Laboratory, to J. S. Kahn, September 9. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-026.	Plowshare		General, CO Amendment
Toman, John	1975	03/11	Letter with Encls. ("Proposed New Release on Lawrence Livermore Laboratory - Industry Proposed High-Explosive, Oil-Simulation Project in Louisiana," letter and release from William Gouse to Ben McCarty, February 11; "Contract No. AT(04-3)-1047;" "Appendix A, Scope of Work) from John Toman, Lawrence Livermore Laboratory, to John Kelly, March 11. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-106.	Plowshare	Caddo Pine Island	

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Toman, J., and A. Tewes	1976	06/14	The Potential of Plowshare for Resource Development. University of California, Lawrence Livermore Laboratory, <i>Preprint UCRL-78309</i> , June 14. Livermore, CA. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Ketch	General, Phenomenology Applications, Storage, Hydrocarbon, Radioactive Waste, Mining, Oil, Gas Stimulation
Tomei, Lawrence R.	1964	06/03	Letter from Lawrence R. Tomei to Mr. Nolan, U.S. Geological Survey, June 3. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Aquarius	
Tonnessen, K. A., and J. J. Cohen	1977	01/14	Survey of Naturally Occurring Hazardous Materials in Deep Geologic Formations: A Perspective on the Relative Hazard of Deep Burial of Nuclear Wastes. University of California, Lawrence Livermore Laboratory, <i>Report UCRL-52199</i> , January 14. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-109.	Plowshare	Radioactive Waste	
Tracy, James F.	1963	03/05	Letter from James F. Tracy, Lawrence Radiation Laboratory, to Burr S. Van Hoosear, March 5. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Geothermal Power Plant	
Trenholme, William M.	1967	11/27	Letter from William M. Trenholme, State of Arizona Atomic Energy Commission, to John F. Philip, November 27. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-001.	Plowshare	Aquarius	
Trenholme, William M. and Harold B. Curtis	1968	07/16	Summary of First Federal-State Meeting on the Aquarius Study, June 25, 1968, Phoenix, Arizona. Report from William M. Trenholme, Arizona Atomic Energy Commission; and Harold B. Curtis, San Francisco Operations Office, July 16. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0161036.	Plowshare	Aquarius	
Trimble, P. E.	1968	12/24	"Nuclear Devices for the Development of Deep Water Ports; Meeting between U.S. Coast Guard and U.S. Army Corp of Engineers." Memo from P. E. Trimble, U.S. Coast Guard, to Chief of Engineers, U.S. Army Corps of Engineers, December 24. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	North Slope Harbor	
Tucson Citizen	1967	06/17	Atom Blast for Water Basin Probed. <i>Tucson Citizen</i> , June 17, Tucson, Arizona.	Plowshare	Aquarius	

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Twenhofel, William S., Jules D. Friedman, and John H. Hancock	1963	02/00	Project Rufus Site Selection: Part II Preliminary Description of Areas. Manuscript, Atomic Energy Commission, Nevada Operations Office, Las Vegas, NV, February.	Vela Uniform	Rufus	
United Aircraft Corporate Systems Center	1964	06/15	Plowshare Structural Damage Study Interim Technical Report. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-13112</i> , June 15. Livermore, CA. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare		General, Technical
United Electrodynamic s, Inc. United Earth Sciences Division	1963	02/08	Long Range Seismic Measurements, Project 8.4, Colona Earthquake (Colorado). Report to Air Force Technical Applications Center from United Electrodynamics, Inc. February 8, Alexandria, VA.	Vela Uniform	Colona Earthquake	
University of California. Office of Public Information	1960	09/15	Press Release, Subject: Nuclear explosions with "block-caving" mining for recovery of ore, from University of California, September 15. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-085.	Plowshare	Copper Recovery, Sloop	Mining
University of Nevada, Reno.	1965	04/26	Plowshare Symposium on the Peaceful Uses of Nuclear Explosives, Thunderbird Hotel, Las Vegas, NV, April 26-29. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare		Symposium
U.S. Army Corps of Engineers. Fort Peck	1966	10/00	Pre-Gondola, High Explosive Chemical Calibration Series. Manuscript, Fort Peck, MT, October. On file at: Fort Peck Archives, U.S. Army Corps of Engineers, Fort Peck, MT, Box 935.	Plowshare	Pre-Gondola	
U.S. Army Corps of Engineers. Fort Peck	1967	06/00	Pre-Gondola II, Chemical High Explosive Row Charge Cratering Experiment. Manuscript, Fort Peck, MT, June. On file at: Fort Peck Archives, U.S. Army Corps of Engineers, Fort Peck, MT, Box 935.	Plowshare	Pre-Gondola	
U.S. Army Corps of Engineers. Fort Peck	1969	10/00	Pre-Gondola III, Phase III, Chemical High Explosive Row Charge Cratering Experiment in Saturated Clay. Manuscript, Fort Peck, MT, October. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-026.	Plowshare	Pre-Gondola	

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U.S. Army Corps of Engineers. Honolulu District	1969	02/00	Nuclear Excavation Feasibility Study for Kaunakakai Harbor, Molokai, Hawaii. Manuscript, Fort Armstrong, Honolulu, HI, February. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-078 [OUO].	Plowshare	Kaunakakai Harbor	
U.S. Army Corps of Engineers. Jacksonville District	1968	00/00	Cape Cod Canal. U.S. Army Corps of Engineers. Jacksonville District. Not on file at the Desert Research Institute.	Plowshare	Cape Cod Canal	
U.S. Army Corps of Engineers. North Pacific Division	1965	03/00	Project Larkspur, Amchitka Island, Alaska: Investigations of Areas 1, 2, 3 and 4. Manuscript, U.S. Army Engineer District, Alaska, March. On file at: Defense Threat Reduction Information Analysis Center, Albuquerque, NM.		Larkspur, Rufus	
U.S. Army Corps of Engineers. Omaha District	1966	06/14	Press Release, Subject: Announcement that Pre-Gondola cratering experiments are scheduled for June; from U.S. Army Corps of Engineers, June 14. On file at: Fort Peck Archives, U.S. Army Corps of Engineers, Fort Peck, MT, Box 917.	Plowshare	Pre-Gondola	
U.S. Army Corps of Engineers. Omaha District	1967	02/23	"Pre-Gondola II, Control Point Layout Plan , Power and Signal." Drawing No. SS3-30E 5.1, February 23. On file at: Fort Peck Archives, U.S. Army Corps of Engineers, Fort Peck, MT, Box 858.	Plowshare	Pre-Gondola	
U.S. Army Corps of Engineers. Omaha District	1971	07/00	Specifications for Diamond Ore Phase II A, Missouri River, Fort Peck Lake, Montana. Invitation for Bids from U.S. Army Corps of Engineers, Omaha, NE, July. On file at: Fort Peck Archives, U.S. Army Corps of Engineers, Fort Peck, MT, Box 927.		Diamond Ore	
U.S. Army Corps of Engineers. Omaha District	1971	07/00	"Diamond Ore Phase II A; Location Plan, Vicinity Map and Index." Drawing No. SS10-30E1, July. On file at: Fort Peck Archives, Army Corps of Engineers, Fort Peck, MT, Box 927.		Diamond Ore	
U.S. Army Corps of Engineers. Omaha District	1971	07/00	"Diamond Ore Phase II A; Location Plan, Vicinity Map and Index." Drawing No. SS10-30E1.1, July. On file at: Fort Peck Archives, Army Corps of Engineers, Fort Peck, MT, Box 927 and Map Drawer 64.		Diamond Ore	

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U.S. Army Corps of Engineers. Omaha District	1971	07/00	"Diamond Ore Phase II A; Site Plan Event II A-1, Instrumentation and Details." Drawing No. SS10-30E2, July. On file at: Fort Peck Archives, Army Corps of Engineers, Fort Peck, MT, Box 927.		Diamond Ore	
U.S. Army Corps of Engineers. Omaha District	1971	07/00	"Diamond Ore Phase II A; Site Plan Event II A-2, Instrumentation and Details." Drawing No. SS10-30E3, July. On file at: Fort Peck Archives, Army Corps of Engineers, Fort Peck, MT, Box 927.		Diamond Ore	
U.S. Army Corps of Engineers. Omaha District	1971	07/00	"Diamond Ore Phase II A; Site Plan Event II A-3, Instrumentation Plan and Details." Drawing No. SS10-30E4, July. On file at: Fort Peck Archives, U.S. Army Corps of Engineers, Fort Peck, MT, Box 927.		Diamond Ore	
U.S. Army Corps of Engineers. Omaha District	1971	07/00	"Diamond Ore Phase II A; Access Hole and Cavity Details." Drawing No. SS10-30E5, July. On file at: Fort Peck Archives, U.S. Army Corps of Engineers, Fort Peck, MT, Box 927.		Diamond Ore	
U.S. Army Corps of Engineers. Omaha District	1971	07/00	"Diamond Ore Phase II A; Target Layout & Details." Drawing No. SS10-30E6, July. On file at: Fort Peck Archives, U.S. Army Corps of Engineers, Fort Peck, MT, Box 927.		Diamond Ore	
U.S. Army Corps of Engineers. Omaha District	1971	07/22	"Diamond Ore Phase II A; Site Plan Event II A-1, Instrumentation and Details." Drawing No. SS10-30E2.1 A, July 22. On file at: Fort Peck Archives, Army Corps of Engineers, Fort Peck, MT, Box 927 and Map Drawer 64.		Diamond Ore	
U.S. Army Corps of Engineers. Omaha District	1971	07/22	"Diamond Ore Phase II A; Site Plan Event II A-2, Instrumentation Plan and Details." Drawing No. SS10-30E3.1 A, July 22. On file at: Fort Peck Archives, Corps of Engineers, Fort Peck, MT, Box 927 and Map Drawer 64.		Diamond Ore	
U.S. Army Corps of Engineers. Omaha District	1971	07/22	"Diamond Ore Phase II A; Site Plan Event II A-3, Instrumentation Plan and Details." Drawing No. SS10-30E4.1 A, July 22. On file at: Fort Peck Archives, Corps of Engineers, Fort Peck, MT, Box 927.		Diamond Ore	
U.S. Army Corps of Engineers. Omaha District	1972	08/00	Specifications for Diamond Ore Phase II B, Missouri River, Fort Peck Lake, Montana. Invitation for Bids from U.S. Army Corps of Engineers, Omaha, NE, August. On file at: Fort Peck Archives, U.S. Army Corps of Engineers, Fort Peck, MT, Box 927.		Diamond Ore	

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U.S. Army Corps of Engineers. Omaha District	1972	08/00	"Diamond Ore Phase II B; Location Plan - Sheet 1, Vicinity Map and Index." Drawing No. SS11-30E1, August. On file at: Fort Peck Archives, Army Corps of Engineers, Fort Peck, MT, Box 927.		Diamond Ore	
U.S. Army Corps of Engineers. Omaha District	1972	08/00	"Diamond Ore Phase II B; Location Plan - Sheet 2." Drawing No. SS11-30E2, August. On file at: Fort Peck Archives, Army Corps of Engineers, Fort Peck, MT, Box 927.		Diamond Ore	
U.S. Army Corps of Engineers. Omaha District	1972	08/00	"Diamond Ore Phase II B; Site Plan Event II B-1, Instrumentation Plans and Detail." Drawing No. SS11-30E3, August. On file at: Fort Peck Archives, Army Corps of Engineers, Fort Peck, MT, Box 927.		Diamond Ore	
U.S. Army Corps of Engineers. Omaha District	1972	08/00	"Diamond Ore Phase II B; Access Trail, Control Point 1." Drawing No. SS11-30E4, August. On file at: Fort Peck Archives, Army Corps of Engineers, Fort Peck, MT, Box 927.		Diamond Ore	
U.S. Army Corps of Engineers. Omaha District	1972	08/00	"Diamond Ore Phase II B; Site SL - 9, Plan." Drawing No. SS11-30E5, August. On file at: Fort Peck Archives, Army Corps of Engineers, Fort Peck, MT, Box 927.		Diamond Ore	
U.S. Army Corps of Engineers. Omaha District	1972	08/00	"Diamond Ore Phase II B; Cavity Details and Camera Bunkers." Drawing No. SS11-30E6, August. On file at: Fort Peck Archives, Army Corps of Engineers, Fort Peck, MT, Box 927.		Diamond Ore	
U.S. Army Corps of Engineers. Omaha District	1972	08/00	"Diamond Ore Phase II B; Existing Phase II A Craters, Crater Plans." Drawing No. SS11-30E7, August. On file at: Fort Peck Archives, Army Corps of Engineers, Fort Peck, MT, Box 927.		Diamond Ore	
U.S. Army Corps of Engineers. Omaha District	1972	08/23	"Abstract of Bids - Construction." Omaha, NE, August 23. On file at: Fort Peck Archives, U.S. Army Corps of Engineers, Fort Peck, MT, Box 927.		Diamond Ore	
U.S. Army Corps of Engineers. Omaha District	1972	10/17	Special Use Permit from U.S. Department of the Interior, Bureau of Sport Fisheries and National Wildlife, to Army Corps of Engineers, Omaha, NE, October 17. On file at: Fort Peck Archives, Corps of Engineers, Fort Peck, MT, Box 857.		Diamond Ore	

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U.S. Army Corps of Engineers. Portland District	2004		Rogue River Basin Projects. U.S. Army Corps of Engineers, Portland District. < http://www.nwp.usace.army.mil/op/R/projects.html >.	Plowshare	Lost Creek	
U.S. Army Corps of Engineers. Walla Walla District	1966	11/00	Nuclear Quarrying Feasibility Study: Twin Springs Dam and Reservoir, Boise River, Idaho. Report to U.S. Army Engineer Nuclear Cratering Group, Livermore, CA, from Walla Walla District, Walla Walla, WA, November. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0330824 [OUO].	Plowshare	Travois	
U.S. Army Corps of Engineers. Walla Walla District	1967	11/00	Bruneau Canyon Project: Feasibility Report on Nuclear Construction Methods. Report to U.S. Army Engineer Nuclear Cratering Group, Livermore, CA, from Walla Walla District, Walla Walla, WA, November. On file at: Engineer Research and Development Center Library, Vicksburg, MS [OUO].	Plowshare	Bruneau Canyon	
U.S. Army Engineer District, Mobile Corps of Engineers	1966	02/15	Tennessee-Tombigbee Waterway, Divide Cut, Nuclear Excavation Feasibility Study. Manuscript, U.S. Army Engineer District, Mobile Corps of Engineers, Mobile, AL, February 15. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-065 [OUO].	Plowshare	Tennessee-Tombigbee Waterway	
U.S. Army Engineer Waterways Experiment Station Explosive Excavation Research Laboratory	1972	03/31	"Listing and Publication Schedule of EERO Reports." Schedule from Explosive Excavation Research Laboratory, Livermore, CA, March 31. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-108.	Plowshare	Drum Inlet, Mini Mound, Trinidad, Pre-Gondola	

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U.S. Army Engineer Waterways Experiment Station Explosive Excavation Research Laboratory	1972	03/31	"Technical Reports Published and Distributed During First Three Quarters FY72." Table from Explosive Excavation Research Laboratory, Livermore, CA, March 31. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-108.	Plowshare	Pre-Gondola, Middle Course, Trinidad	
U.S. Army Engineer Waterways Experiment Station Explosive Excavation Research Laboratory	1972	06/30	"Listing and Publication Schedule of EERL Reports." Schedule from Explosive Excavation Research Laboratory, Livermore, CA, June 30. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-108.	Plowshare	Libby, Lost Creek	
U.S. Army Engineer Waterways Experiment Station Explosive Excavation Research Laboratory	1972	09/00	"Listing and Publication Schedule of EERL Reports." Schedule from Explosive Excavation Research Laboratory, Livermore, CA, September. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-108.	Plowshare	Diamond Ore, Drum Inlet, Middle Course, Trinidad	
U.S. Atomic Energy Commission			Plowshare. U.S. Atomic Energy Commission, Division of Technical Information, Understanding the Atom Series. Washington, D.C. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		General, Overview
U.S. Atomic Energy Commission	1958	04/18	Plowshare Planning. U.S. Atomic Energy Commission, April 18.	Plowshare	Boothia Isthmus Canal Project	
U.S. Atomic Energy Commission	1958	07/00	Plowshare Program. In <i>Twenty-fourth Semiannual Report of the Atomic Energy Commission</i> , p. 15, July.	Plowshare		General, AEC Annual

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U.S. Atomic Energy Commission	[1958]		Letter from U.S. Atomic Energy Commission to Fred A. Seaton. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-105.	Plowshare	Vintage	
U.S. Atomic Energy Commission	1959	05/27	"For Shute - Info to Gerald Johnson - From Keto." Telex from U.S. Atomic Energy Commission to U.S. Atomic Energy Commission, San Francisco District, May 27. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-105.	Plowshare	Vintage	
U.S. Atomic Energy Commission	1961	01/00	Civil Uses of Nuclear Explosives, In <i>Annual Report to Congress of the Atomic Energy Commission</i> , pp.152-156, January. Government Printing Office, Washington, D. C.	Plowshare	Cowboy, Pinot, Plowboy	General, AEC Annual
U.S. Atomic Energy Commission	1961	04/07	Plowshare Program. Report to the General Manager by Director of Military Application, April 7 [OUO].	Plowshare	Ditchdigger, Wagon, Wheelbarrow	General
U.S. Atomic Energy Commission	1962	01/00	Plowshare Program. In <i>Annual Report to Congress of the Atomic Energy Commission</i> , pp. 208-219, January. Government Printing Office, Washington, D. C.	Plowshare	Wagon	General, AEC Annual
U.S. Atomic Energy Commission	1962	09/11	Atomic Energy Commission Meeting 1872: Tuesday, September 11, 1962. Minutes from U.S. Atomic Energy Commission, November 9. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0032480.	Plowshare	Buggy, Dogsled, Wheelbarrow	
U.S. Atomic Energy Commission	1963	01/00	Plowshare Program. In <i>Annual Report to Congress of the Atomic Energy Commission</i> , pp. 2241-252, January. Government Printing Office, Washington, D.C.	Plowshare	Dogsled, Galley, Phaeton, Yo-Yo	General, AEC Annual
U.S. Atomic Energy Commission	1963	03/20	Long Range Plan, 1964-1973, Peaceful Uses of Nuclear Explosives Program (Plowshare). Report from U.S. Atomic Energy Commission, March 20. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Dogsled, Galley, Phaeton, Subway, Surrey, Wheelbarrow	
U.S. Atomic Energy Commission	1963	05/00	Guidelines for the Management and Administration of the Plowshare Program. Manuscript, Division of Peaceful Nuclear Explosives, May. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare		General
U.S. Atomic Energy Commission	1964	01/00	Plowshare Program. In <i>Annual Report to Congress of the Atomic Energy Commission for 1963</i> , pp. 207-228, January. U.S. Government Printing Office, Washington, D.C.	Plowshare	Carryall, Galley, Wheelbarrow	General, AEC Annual

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U.S. Atomic Energy Commission	1964	01/16	"AEC Seeks Bids on Drilling for Project Dribble in Mississippi." Press Release from U.S. Atomic Energy Commission, January 16. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Vela Uniform	Dribble, Sand, Tar, Salmon	
U.S. Atomic Energy Commission	1964	07/00	Suggested Nuclear Excavation Projects and Possible Nuclear Excavation Projects. Manuscript, Division of Peaceful Nuclear Explosives, July. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Various	General
U.S. Atomic Energy Commission	1965	01/00	Plowshare Program. In <i>Annual Report to Congress of the Atomic Energy Commission for 1964</i> , pp. 155-176, January. U.S. Atomic Energy Commission, U.S. Government Printing Office, Washington D.C.	Plowshare	Carryall, Tennessee-Tombigbee	General, AEC Annual
U.S. Atomic Energy Commission	1965	12/31	Concept for Project Cabriolet (Attachment to NV0905870). Report from U.S. Atomic Energy Commission, December. On file at Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0905871.	Plowshare	Cabriolet	
U.S. Atomic Energy Commission	1966	01/00	Chapter 12 - The Plowshare Program. In <i>Annual Report to Congress of the Atomic Energy Commission for 1965</i> , pp. 191-209, January. U.S. Atomic Energy Commission, U.S. Government Printing Office, Washington D.C.	Plowshare	Carryall, Ketch, Pre-Schooner II, Sloop	General, AEC Annual
U.S. Atomic Energy Commission	1966	01/24	Reprogramming Activities in Plowshare Program FY 1966 and FY 1967. Manuscript, U.S. Atomic Energy Commission, Peaceful Nuclear Explosives, AEC 111/136, January 24. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0075653.	Plowshare	Galley; unnamed Idaho experiment	
U.S. Atomic Energy Commission	1967		<i>Plowshare Program During 1966: Based on the Annual Report to Congress for 1966 of the U.S. Atomic Energy Commission.</i> U.S. Atomic Energy Commission, U.S. Government Printing Office, Washington, D.C. On file at Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029; and Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Bronco, Cabriolet, Dragon Trail, Ketch, Pre-Gondola, WASP	General
U.S. Atomic Energy Commission	1967	01/00	Chapter 11 - Plowshare Program. In <i>Annual Report to Congress of the Atomic Energy Commission for 1966</i> , pp. 239-258, January. U.S. Atomic Energy Commission, U.S. Government Printing Office, Washington D.C.	Plowshare	Dragon Trail, Ketch, Pre-Gondola, Sloop	
U.S. Atomic Energy Commission	1967	01/23	"AEC to Conduct Plowshare Cratering Experiment in Nevada." Press Release from U.S. Atomic Energy Commission, January 23. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-006.	Plowshare	Cabriolet	

AUTHOR	YEAR	MONTH/ DAY	TITLE AND DOCUMENT SOURCE	PROGRAM	PROJECT(S)	OTHER
U.S. Atomic Energy Commission	1967	01/24	Report on Project Ketch Meeting, Nuclear Excavation for Underground Gas Storage. Notes from meeting with U.S. Atomic Energy Commission, Commonwealth, and Columbia Gas System Service Corporation, January 24. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0188125.	Plowshare; Vela Uniform	Dragon Trail, Ketch, Sloop	General, AEC Annual
U.S. Atomic Energy Commission	1967	02/09	Letter from Chairman, U.S. Atomic Energy Commission, to Bruce Graham, February 9. On file at: National Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0075871.	Plowshare	Geothermal Power	
U.S. Atomic Energy Commission	1967	02/16	Press Release, Subject: AEC to conduct feasibility study for using nuclear explosives to create underground gas storage (Project Ketch), from U.S. Atomic Energy Commission, February 16. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Ketch	
U.S. Atomic Energy Commission	1967	03/06	Nuclear Underground Tests in Planning or Feasibility Stage. Table, March 6. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0188117.	Plowshare	Bronco, Dragon Trail, Ketch, Sloop	
U.S. Atomic Energy Commission	1967	04/17	"Statement on the Civilian Applications of Nuclear Explosives (Plowshare) Program, U.S. Atomic Energy Commission FY 1968 Authorization Hearings Before the Joint Committee on Atomic Energy." Statement from U.S. Atomic Energy Commission, April 17. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-028.	Plowshare	Bronco, Cabriolet, Dragon Trail, Ketch, Pre-Schooner II, Sloop	General
U.S. Atomic Energy Commission	1967	10/16	Proposal for a Joint Experiment (Project Sloop). <i>Atomic Energy Clearing House</i> , Vol. 13, No. 42, pp. 8-12, October 16. Washington, D.C. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0065739.	Plowshare	Sloop	
U.S. Atomic Energy Commission	1968	01/00	Chapter 11 - The Plowshare Program. In <i>Annual Report to Congress of the Atomic Energy Commission for 1967</i> , pp. 199-208, January. U.S. Government Printing Office, Washington, D.C.	Plowshare	Bronco, Dragon Trail, Ketch, Payette, Pre-Gondola, Sloop	
U.S. Atomic Energy Commission	1968	01/28	Tables, graphs, and charts on Cabriolet sample station data, January 25-28. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0171484.	Plowshare	Cabriolet	

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U.S. Atomic Energy Commission	1968	01/29	"Civilian Applications of Nuclear Explosives (Plowshare) Program – Operating Costs, FY 1969 Budget Estimates: Appropriation – Operating Costs." On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900205, 28/48.	Plowshare	Bronco, Cabriolet, Dragon Trail, Ketch, Sloop	
U.S. Atomic Energy Commission	1968	05/28	Letter from Chairman, U.S. Atomic Energy Commission, to Robert R. Lee, May 28. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Bruneau Canyon Dam	
U.S. Atomic Energy Commission	1968	10/00	Plowshare Program. Booklet. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Bronco, Dragon Trail, Sloop	General, Overview
U.S. Atomic Energy Commission	1969	01/00	Chapter 11 - Peaceful Nuclear Explosions. In <i>Annual Report to Congress of the Atomic Energy Commission for 1968</i> , pp.195-202, January. U.S. Government Printing Office, Washington, D.C.	Plowshare	Aquarius, Bronco, Dragon Trail, Ketch, Sloop, WASP	General, AEC Annual
U.S. Atomic Energy Commission	1969	04/18	"Hearings Before the Joint Committee on Atomic Energy, Congress of the United States, Ninety-First Congress, First Session on General, Physical, Research Program, Space Nuclear Program, and Plowshare, April 17 and 18, Part I." Hearings, April 18. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	North Slope Harbor	
U.S. Atomic Energy Commission	1969	04/18	"United States Atomic Energy Commission, Plowshare Program Statement, JCAE FY 1970 Authorization Hearings." Statement from U.S. Atomic Energy Commission, April 18. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-028.	Plowshare	Dragon Trail, Galley, Phaeton, Pre-Gondola, Sloop, Yawl, Gondola	General
U.S. Atomic Energy Commission	1969	04/21	"Agreement for North Slope Harbor Feasibility Study." Agreement, U.S. Atomic Energy Commission and Humble Oil and Refining Company, April 21. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	North Slope Harbor	
U.S. Atomic Energy Commission	1969	05/23	Press Release, Subject: "AEC Plowshare Division Reorganized." From U.S. Atomic Energy Commission, May 23. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		General

AUTHOR	YEAR	MONTH/ DAY	TITLE AND DOCUMENT SOURCE	PROGRAM	PROJECT(S)	OTHER
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U.S. Atomic Energy Commission	1970	01/00	Chapter 11 - Peaceful Nuclear Explosives. In <i>Annual Report to Congress of the Atomic Energy Commission for 1969</i> , pp. 195-203, January. U.S. Government Printing Office, Washington D.C.	Plowshare	Aquarius, Bronco, Dragon Trail, Ketch, Sloop, Utah, Wagon Wheel, WASP	General, AEC Annual
U.S. Atomic Energy Commission	1970	03/05	"Plowshare Program Statement, JCSE FY 1971 Authorization Hearings." Statement from U.S. Atomic Energy Commission, March 5. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-028.	Plowshare	Aquarius, Bronco, Ketch, Sloop, Wagon Wheel, WASP, Yawl	
U.S. Atomic Energy Commission	1970	06/00	Nevada Test Site...America's Outdoor Nuclear Explosives Laboratory. Booklet, June. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-118.	Plowshare		General, NTS
U.S. Atomic Energy Commission	1971	01/00	Chapter 9 - Peaceful Nuclear Explosives. In <i>Annual Report to Congress of the Atomic Energy Commission for 1970</i> , pp. 195-202, January. U.S. Government Printing Office, Washington D.C.	Plowshare	Dragon Trail, Geothermal Power Plant, Utah, Wagon Wheel, WASP	General, AEC Annual
U.S. Atomic Energy Commission	1971	01/18	Translations of French and Soviet Papers Presented at the Second Panel on the Peaceful Uses of Nuclear Explosions, January 18-22, Vienna, Austria. International Atomic Energy Agency, University of California, Lawrence Livermore Laboratory, UCRL-Trans-10543. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-028.	Plowshare		General-IAEA
U.S. Atomic Energy Commission	1971	03/23	S.958 AEC Authorization Bill for Fiscal Year 1972 (Nuclear Waste Disposal). Hearings Before the Joint Committee on Atomic Energy, Congress of the United States, Washington, D.C., March 23. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-028.	Plowshare	Wagon Wheel	

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U.S. Atomic Energy Commission	1972	01/00	Plowshare Program. In <i>Annual Report to Congress of the Atomic Energy Commission for 1971</i> , pp. 139-142, January. U.S. Government Printing Office, Washington D.C.	Plowshare	Dragon Trail, Geothermal Power Plant, Wagon Wheel	
U.S. Atomic Energy Commission	1972	04/00	Wagon Wheel Gas Stimulation Project, Sublette County, Wyoming, Environmental Statement. U.S. Atomic Energy Commission, Report Nos. WASH-1524 and PNE-WW-5, April. Washington, D.C. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Wagon Wheel	
U.S. Atomic Energy Commission	[1974]		Total AEC (ERDA) Plowshare Budget FY 1958-77. Figure. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-031.	Plowshare		General, Budget
U.S. Atomic Energy Commission. Albuquerque Operations Office	1959	12/00	"Pre-Vintage Meetings to be Held at LRL." Telex to U.S. Bureau of Mines, December. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-105.	Plowshare	Pre-Vintage	
U.S. Atomic Energy Commission. Albuquerque Operations Office	1959	12/09	"Special Provisions Involved in the Bureau of Mines Support to Project Pre-Vintage." Telex from U.S. Atomic Energy Commission, San Francisco Operations Office, to Russell Ball, December 9. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-105.	Plowshare	Pre-Vintage	
U.S. Atomic Energy Commission. Albuquerque Operations Office	1961	05/00	Project Manager's Report Project Pinot, Plowshare Program. Manuscript, U.S. Atomic Energy Commission, May. Albuquerque, NM. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV and Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-032.	Plowshare	Pinot	

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U.S. Atomic Energy Commission. Division of Technical Information	1969		Status of Nuclear Test Reports. U.S. Atomic Energy Commission, Report TID-9533. Washington, D.C. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0105641. Note: Document location?	Plowshare, Vela Uniform	Bronco, Cowboy, Ketch, Pre-Gondola, Sloop	
U.S. Atomic Energy Commission. Nevada Operations Office	1960	03/04	Press Release, Subject: non-nuclear high explosive experiments, from U.S. Atomic Energy Commission, March 4. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0322679.	Vela Uniform	Cowboy	
U.S. Atomic Energy Commission. Nevada Operations Office	1964	05/00	Conceptual Engineering and Construction Plan for Tar and Sand Events at Hockley Salt Dome, Project Dribble. Manuscript, U.S. Atomic Energy Commission, May. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Vela Uniform	Dribble, Sand, Tar	
U.S. Atomic Energy Commission. Nevada Operations Office	1964	05/00	Re-Evaluation of the Hockley Site, Project Dribble. Manuscript, U.S. Department of Energy, May. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Vela Uniform	Dribble, Sand, Tar	
U.S. Atomic Energy Commission. Nevada Operations Office	1964	07/00	Project Dribble Facilities and Support Execution. Manuscript, U.S. Department of Energy, Las Vegas, NV, July. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Vela Uniform	Dribble, Salmon, Sand, Tar	

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U.S. Atomic Energy Commission. Nevada Operations Office	1966	02/10	Press Release, Subject: Post-shot excavation in and around the Pre-Schooner II crater, from U.S. Atomic Energy Commission, NV-66-11, February 10.	Plowshare	Pre-Schooner II	
U.S. Atomic Energy Commission. Nevada Operations Office	1966	04/00	Briefing Material for the Plowshare Program. Manuscript, U.S. Atomic Energy Commission, April. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Galley, Ketch	
U.S. Atomic Energy Commission. Nevada Operations Office	1966	06/00	Project Payette, Proposal - Phase I. Manuscript, U.S. Atomic Energy Commission, June. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV [OUO].	Vela Uniform	Payette	
U.S. Atomic Energy Commission. Nevada Operations Office	1966	06/20	Phase I, Project Payette. Manuscript, U.S. Atomic Energy Commission, June 20. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-031.	Vela Uniform	Payette	
U.S. Atomic Energy Commission. Nevada Operations Office	1966	10/07	Press Release, Subject: Project Payette proposals, from U.S. Atomic Energy Commission, NV-66-118, October 7. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-031.	Vela Uniform	Payette	
U.S. Atomic Energy Commission. Nevada Operations Office	1967	06/06	Press Release, Subject: Visit by Atomic Energy Commission to Clinton and Centre Counties, Pennsylvania for Ketch Event Feasibility Study, from U.S. Atomic Energy Commission, June 6. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0162648.	Plowshare	Ketch	

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U.S. Atomic Energy Commission. Nevada Operations Office	1967	06/30	Plowshare Cost Report for Period Ending June 30 1967. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-026 [OUO].	Plowshare		General, Cost
U.S. Atomic Energy Commission. Nevada Operations Office	1967	10/02	Project Dragon Trail Project Manager's Plan. Manuscript, U.S. Atomic Energy Commission, October 2. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-012. .	Plowshare	Dragon Trail	
U.S. Atomic Energy Commission. Nevada Operations Office	1968	01/25	Press Release, Subject: AEC to conduct Plowshare experiment at the Nevada Test Site, with encl. ("Background Information on Project Cabriolet"), January 25. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File No. PLO-006.	Plowshare	Cabriolet	
U.S. Atomic Energy Commission. Nevada Operations Office	1968	01/26	Press Release, Subject: AEC to conduct a low-yield nuclear excavation experiment at the Nevada Test Site, from U.S. Atomic Energy Commission, January 26. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-006.	Plowshare	Cabriolet	
U.S. Atomic Energy Commission. Nevada Operations Office	1968	05/31	Press Release from U.S. Atomic Energy Commission, May 31. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0325209.	Plowshare	Aquarius	
U.S. Atomic Energy Commission. Nevada Operations Office	1969	01/30	Press Release, Subject: The AEC has identified areas in Montana, South Dakota, and Nevada suitable for an earth moving experiment using nuclear explosives, from U.S. Atomic Energy Commission, January 30. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession NV 0325590.	Plowshare	Gondola	

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U.S. Atomic Energy Commission. Nevada Operations Office	1969	03/27	Press Release from U.S. Atomic Energy Commission, to Editors and Correspondents, March 27. On file at Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0325552.	Plowshare	Aquarius	
U.S. Atomic Energy Commission. Nevada Operations Office	1969	08/00	Effects Evaluation for Sturtevant and Yawl. U.S. Atomic Energy Commission, Nevada Operations Office, Report, No. NVO-44, August. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-072 [OUO].	Plowshare	Yawl	
U.S. Atomic Energy Commission. Nevada Operations Office	1970	03/00	Project Wagon Wheel: Preliminary Site Evaluation Report. U.S. Atomic Energy Commission, Nevada Operations Office, Report No. NVO-55, March. Las Vegas, NV. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Wagon Wheel, WASP	
U.S. Atomic Energy Commission. Nevada Operations Office	1970	05/00	Effects Evaluation Planning Guide for Plowshare Projects (Draft). Manuscript, May. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare		General, Procedures
U.S. Atomic Energy Commission. Nevada Operations Office	1970	07/00	Project WASP: Preliminary Site Evaluation Report, Merna Site. U.S. Atomic Energy Commission, Nevada Operations Office, Report No. NVO-54, July. Las Vegas, NV. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	WASP	

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U.S. Atomic Energy Commission. Nevada Operations Office	1970	08/00	Effects Evaluation Planning Guide for Plowshare Projects (Draft). Manuscript, August. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare		General, Procedures
U.S. Atomic Energy Commission. Nevada Operations Office	1970		Project WASP Site Evaluation Report. Manuscript, Las Vegas, NV. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	WASP	
U.S. Atomic Energy Commission. Nevada Operations Office	[1970?]		Project Wagon Wheel Site Evaluation Report. Manuscript, Las Vegas, NV, no date. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Wagon Wheel	
U.S. Atomic Energy Commission. Nevada Operations Office	1970 - 1971	00/00	Test Manager's Report. Monthly Reports for March 1970 - March 1971. On file at: Archives and Research Center, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession Nos. NV0310041, NV0310040, NV0310039, NV0310038, NV0310036, NV0310033, NV0310032, NV0310031, NV0310030, NV0310029.	Plowshare	Cabriolet	
U.S. Atomic Energy Commission. Nevada Operations Office	1971	03/00	Industrial Sponsor Information Submittals for Effects Evaluations of Plowshare Projects, Preliminary. Manuscript, March. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare		General, Procedures
U.S. Atomic Energy Commission. Nevada Operations Office	1971	04/22	Project Plowshare Observation Flight. U.S. Atomic Energy Commission, Nevada Operations Office, April 22. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA. File PLO-029.	Plowshare		General

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U.S. Atomic Energy Commission. Nevada Operations Office	1972	05/00	Reports Available in Plowshare Open File. Report, NVO-D171886 (Rev. 1) UC-35, May. On file at: Defense Threat Reduction Information Analysis Center, Albuquerque, NM.	Plowshare	Wagon Wheel	General
U.S. Atomic Energy Commission. Nevada Operations Office	1972	10/18	Contract Between The United States of America, Represented by The United States Atomic Energy Commission, and Kennecott Copper Corporation. Draft, October 18. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-087.	Plowshare	Copper Ore Chemical Mining	
U.S. Atomic Energy Commission. Nevada Operations Office	1973	06/00	Significant Peaceful Nuclear Explosion Events and Related Activities. U.S. Atomic Energy Commission, Nevada Operations Office, Report NVO-134, Las Vegas, NV. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Pinot	General, Chronology
U.S. Atomic Energy Commission. Nevada Operations Office	1973	12/11	Press Release, Subject: land withdrawal for geothermal investigations, from U.S. Atomic Energy Commission, December 11. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0326105.		Geothermal Energy	
U.S. Atomic Energy Commission. Nevada Operations Office	1974	07/16	Plowshare Cost Report Transmittal. Nevada Operations Office, Finance Division, July 16. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-026.			General, Cost

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U.S. Atomic Energy Commission. San Francisco Operations Office	1959	11/10	"AEC Announces Appointment of Plowshare Advisory Committee." Press Release, November 10. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		General, PAC
U.S. Atomic Energy Commission. San Francisco Operations Office	[1967]		Summary of the Sloop Feasibility Study. Manuscript, San Francisco Operations Office, Lawrence Radiation Laboratory, U.S. Bureau of Mines, Kennecott Copper, and Oak Ridge National Laboratory. On file at: Nuclear Testing Archives, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0162229.	Plowshare	Sloop	
U.S. Atomic Energy Commission. San Francisco Operations Office	1968	05/31	Press Release from U.S. Atomic Energy Commission, May 31. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Aquarius	
U.S. Atomic Energy Commission. San Francisco Operations Office	1974	04/00	"Role of PMSEP in San Energy Programs." On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.			General, Admin
U.S. Atomic Energy Commission and U.S. Department of Defense	1964	09/10	Press Release, Subject: Project Dribble, from U.S. Department of Energy and U.S. Department of Defense, September 10.	Vela Uniform	Dribble, Salmon, Pre-Dribble	

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U.S. Coast and Geodetic Survey	1913		<i>South Coast of Alaska, Controller Bay Map.</i> Washington, D.C. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	Katalla Harbor	
U.S. Coast Guard	1969	01/22	"Participants of a Meeting with Coast Guard, Corps, and PNE at USCG, January 22, 1969." List of Participants, January 22. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	North Slope Harbor	
U.S. Congress	1988	05/00	Seismic Verification of Nuclear Testing Treaties. U.S. Congress, Office of Technology Assessment, OTA-ISC-361, May. Washington, D.C.	Vela Uniform		General
U.S. Congressional Record	1974	06/12	Congressional Record. Proceedings and Debates of the 93rd Congress, Second Session, Vol. 120, No. 85, June 12, 1974. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-026.			General, CO Amendment
U.S. Department of Defense and U.S. Atomic Energy Commission	1964	08/01	Project Dribble. Manuscript, U.S. Department of Defense, Hattiesburg, MS; and U.S. Atomic Energy Commission, Las Vegas, NV, August 1. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas NV; and Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.	Vela Uniform	Dribble, Salmon, Sand, Tar, Pre-Dribble	
U.S. Department of Energy News. Nevada Operations Office	1977	10/07	Press Release, Subject: Six Geothermal contracts awarded, from U.S. Department of Energy News, Doc. No. NV-77-67, October 7. On file at: Atomic Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0333191.	Plowshare	Geothermal Power, Yellow	
U.S. Department of Energy. Nevada Operations Office	1980	05/02	Press Release, Subject: DOE awards contract for testing four geopressured geothermal wells, from U.S. Department of Energy, May 2. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Las Vegas, NV, Accession No. NV0335248.	Plowshare	Geothermal Power	
U.S. Department of Energy. Office of Environmental Management	2002	09/29	Geothermal Test Facility < http://www.em.doe.gov/ca/ca-gtf.html >, accessed on September 29.	Plowshare	Geothermal Power	

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U.S. Department of Energy. Nevada Operations Office			The Plowshare Program (Draft). Report from U.S. Department of Energy.	Plowshare	Various	General, Overview
U.S. Department of Energy. Nevada Operations Office	1969	01/30	Press Release, Subject: Possible earth moving experiment using a nuclear explosive, from U.S. Atomic Energy Commission, January 30. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0325590.	Plowshare	Gondola	
U.S. Department of Energy. Nevada Operations Office	1997	12/22	Plowshare Program Executive Summary. Report from U.S. Department of Energy, December 22.	Plowshare	Various	General, Overview
U.S. Department of Health, Education, and Welfare. Southwestern Radiological Health Laboratory	1969	07/31	Preliminary Off-Site Area Survey - Wasp: Off-Site Radiological Safety Aspects. Report to U.S. Atomic Energy Commission from Southwestern Radiological Health Laboratory, July 31. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0134181.	Plowshare	WASP	
U.S. Department of the Interior. Bureau of Land Management			"Status of Public Domain Land and Mineral Titles and Acquired Lands, Mt. Plat, Township 26 North Range 39 East of the Principal Meridian, Montana." Drawings and table pp. 1-5, 8. On file at: U.S. Department of the Interior, Bureau of Land Management, Montana State Office, Billings, MT.	Plowshare	Pre-Gondola	
U.S. Department of the Interior. Bureau of Land Management			"Status of Public Domain Land and Mineral Titles and Acquired Lands, Mt. Plat, Township 25N Range 39E, East of the Principal Meridian, Montana." Tables, pp. 2-3, 5, 7, 9. On file at: U.S. Department of the Interior, Bureau of Land Management, Montana State Office, Billings, MT.	Plowshare	Pre-Gondola	

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U.S. Department of the Interior. Bureau of Mines	1959	01/00	Application Nuclear Explosions to Oil-Shale Utilization. Report for Bureau of Mines - U.S. Atomic Energy Commission Industry Meeting, Dallas, TX, January. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-105.	Plowshare	Vintage	
U.S. Department of the Interior. Bureau of Mines	1959	11/00	High-Explosive Experiment at the Rifle Oil-Shale Mine, A Preliminary Research Proposal for the Plowshare Program. Manuscript, U.S. Department of the Interior, November. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Pinot	
U.S. Department of the Interior. Bureau of Mines	1960	07/00	Underground Site Investigation: Colorado, Utah, Wyoming, Phase I. Report to U.S. Atomic Energy Commission from Bureau of Mines, July. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, July.	Plowshare		General, Reference, Mines
U.S. Department of the Interior. Bureau of Mines	1965	03/00	Minutes Third Annual Plowshare Review Meeting, Denver, Colorado, January 28, 1965. Bureau of Mines and Atomic Energy Commission, March. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV [OUO].	Plowshare	Hansom, Dribble, Salmon	General, Applications
U.S. Department of the Interior. Bureau of Mines	1968	05/00	Prospects for Oil Shale Development, Colorado, Utah, and Wyoming. Manuscript, May. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Bronco, Utah	
U.S. Department of the Interior. Geological Survey			"NW-SE Geologic Section Through SW Part of Hattiesburg, Mississippi." Drawing. On file at: Engineering and Records Library, Nevada Test Site, Mercury, NV.	Vela Uniform	Dribble	

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U.S. Department of the Interior. Geological Survey	1948		<i>Cordova, Alaska, Quadrangle Map.</i> Washington, D.C. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	Katalla Harbor	
U.S. Department of the Interior. Geological Survey	1953		<i>Cordova (A-1), Alaska, Quadrangle Map,</i> 1:63 360 series, Washington, D.C. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	Katalla Harbor	
U.S. Department of the Interior. Geological Survey	1953		<i>Cordova (A-2), Alaska, Quadrangle Map,</i> 1:63 360 series, Washington, D.C. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	Katalla Harbor	
U.S. Department of the Interior. Geological Survey	1953		<i>Cordova (B-1), Alaska, Quadrangle Map,</i> 1:63 360 series, Washington, D.C. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	Katalla Harbor	
U.S. Department of the Interior. Geological Survey	1953		<i>Cordova (B-2), Alaska, Quadrangle Map,</i> 1:63 360 series. Washington, D.C. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	Katalla Harbor	
U.S. Department of the Interior. Geological Survey	[1960]		"Generalized Map of Surficial Deposits Within 25 Miles of Tatum Salt Dome." Drawing. On file at: Engineering and Records Library, Nevada Test Site, Mercury, NV.	Vela Uniform	Dribble	
U.S. Department of the Interior. Geological Survey	1962	10/00	Revised Work Plan and Operating Budget, Project Dribble, Fiscal Years 1963 and 1964. Report from Geological Survey, Washington, D.C., October. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Vela Uniform	Dribble	

AUTHOR	YEAR	MONTH/ DAY	TITLE AND DOCUMENT SOURCE	PROGRAM	PROJECT(S)	OTHER
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U.S. Department of the Interior. Geological Survey	[1966]		Summary of Water Conditions and Suggested Programs for Evaluation of Hydrological Safety of Nuclear Excavation at Three Proposed Dam Sites: Buchanan Damsite, California; Twin Springs Damsite, Idaho; and Cochiti Damsite, New Mexico. Report to U.S. Atomic Energy Commission from Geological Survey. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV [OUO].	Plowshare	Buchanan Dam, Travois, Cochiti Dam	
U.S. Energy Research and Development Administration	1975	04/00	Reports Available in Plowshare Open File. Nevada Operations Office, Report NVO-86 (Rev. 5), April. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare		General
U.S. Energy Research and Development Administration	1976	01/00	Nevada Test Site. Pamphlet, January. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-118.	Plowshare		General, NTS
U.S. Energy Research and Development Administration	1976	01/19	FY 1977 Budget Estimates: Nuclear Explosive Applications Program: Operating Costs. Budget, January 19. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.			General, Budget
U.S. Environmental Protection Agency	[1972?]		Comments on Draft Environmental Statement for Wagon Wheel Gas Stimulation Project, Wyoming, (AEC Document WASH-1524). Manuscript, no date. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0076274.	Plowshare	Wagon Wheel	
U.S. PNE Program			U.S. PNE Program. Table. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-031.	Plowshare		General
U.S. Public Health Service. Department of Health, Education and Welfare	[1966]		PHS Off-Site Evaluation of Buchanan Dam and Reservoir Project Chowchilla, California. Manuscript, Las Vegas, NV. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Buchanan Dam	

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U.S. Public Health Service. Department of Health, Education and Welfare	[1966]		PHS Off-Site Evaluation of Cochiti Dam and Reservoir Project, Cochiti, New Mexico. Manuscript, Las Vegas, NV. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Cochiti Dam	
U.S. Public Health Service. Department of Health, Education and Welfare	[1966]		PHS Off-Site Evaluation of Twin Springs Dam and Reservoir Project, Twin Springs, Idaho. Manuscript, Las Vegas, NV. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Travois	
Valley Times	1977	10/28	Plowshare: End of a Lab Era. <i>Valley Times</i> , October 28. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		General
Vandenberg, William E.	1969	11/05	Letter from William E. Vandenberg, U.S. Army Engineer Nuclear Cratering Group, Lawrence Radiation Laboratory, to Donald C. Beckman, November 11. On file at: Fort Peck Archives, U.S. Army Corps of Engineers, Fort Peck, MT, Box 860.	Plowshare	Pre-Gondola	
Vandenberg, William E.	1970	11/06	Letter with Encls. ("Project Trinidad Test Program; form for attendance at railroad cut detonation of Project Trinidad; Visitor's Schedule, Project Trinidad - railroad cut detonation; "Project Trinidad, D Series, Chemical Explosive Cratering Experiment in Weak Rock," manuscript, U.S. Army Corps of Engineers, Nov. - Dec. 1970) from William E. Vandenberg, Lawrence Radiation Laboratory, U.S. Army Engineer Nuclear Cratering Group, to Glenn Werth, November 6. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare	Trinidad	
Vandenberg, William E., and Walter C. Day	1970	05/00	Excavation Research with Chemical Explosives. In <i>Symposium on Engineering with Nuclear Explosives: Proceedings</i> , Report CONF-700101, Vol. 1, pp. 360-373, May. American Nuclear Society, Hinsdale, IL.	Plowshare	Pre-Gondola	
van der Harst, Leo	1974	10/16	Letter with Encl. (Concept of an Experimental Program to Investigate the Potential of Stimulating Oil and Gas Wells Using Chemical Explosives) from Leo van der Harst, CER Geonuclear Corporation, Las Vegas, NV, to John Toman, October 16. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-095.			Phenomenology High Explosive

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van der Harst, Leo	1974	11/19	Letter with Encl. (A Proposed Experimental Program to Investigate the Potential of Stimulating Oil and Gas Wells Using Chemical Explosives. Minutes of High Explosives Meeting, Denver, CO, November 6) from Leo van der Harst, CER Geonuclear Corporation, Las Vegas, NV, to Attendees of the High Explosives (HE) Meeting, November 19. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-095.			Phenomenology High Explosive
van der Harst, Leo, and Robert S. Brundage	1971		Base-Load LNG Storage in Underground Reservoirs Created by Nuclear Explosives. Manuscript, CER Geonuclear Corporation, Las Vegas, NV. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-095.	Plowshare	Atlantic Gas Storage	
Van Hoosear, Burr S.	1963	01/28	"Peaceful Uses of Atomic Energy." Letter from Burr S. Van Hoosear to John S. Foster, January 28. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Geothermal Power Plant	
Venn, R. H.	1969	08/12	Letter from R. H. Venn, Vice President, Humble Oil & Refining Company, to Seaborg, August 12. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	North Slope Harbor	
Vergari, A. A.	1969	03/01	"Plowshare Cost Report (Program 09 and Related Program 35-09)." Memo from A. A. Vergari, U.S. Atomic Energy Commission, San Francisco Operations Office, to Those Listed Below, March 1. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900205, 28/48.	Plowshare		General, Cost Report
Vermillion, Henry G.	1963	12/06	Letter with Encl. (Letter from J. A. Keetch to Henry Vermillion, November 29) from Henry G. Vermillion, U.S. Atomic Energy Commission, Nevada Operations Office, to Gary Higgins, December 6. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Miscellaneous	
Vermillion, Henry G.	1967	10/18	"Project Ketch Briefings in Pennsylvania." Memo from Henry G. Vermillion, U.S. Atomic Energy Commission, Nevada Operations Office, to Files, October 18. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0188167.	Plowshare	Ketch	
Vermillion, Henry G.	1968	01/24	Letter from H. G. Vermillion to G. K. Plumleigh, January 24. On file at: Nuclear Testing Archive, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV, Accession No. NV0188360.	Plowshare	Bronco, Dragon Trail, Ketch, Sloop	

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Vesper, Howard G.	1972	05/22	Letter with Encl. (Report on the Ad Hoc Plowshare Review Committee) from Howard G. Vesper, General Advisory Committee, U.S. Atomic Energy Commission, to James R. Schlesinger, May 22. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-028 [OUO].	Plowshare	Wagon Wheel	General, GAC
Violet, C. E.	1958	12/11	"Technical Steering Committee, Project Vintage." Memo from C. E. Violet, Lawrence Radiation Laboratory, to Distribution, December 11. On file at: Archives and Records Office, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-105.	Plowshare	Vintage	
Violet, C. E.	1959	11/04	Letter from C. E. Violet, Lawrence Radiation Laboratory, to John E. Crawford, November 4. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-105.	Plowshare	Pre-Vintage	
Violet, C. E.	1959	11/20	Memo from C. E. Violet, Lawrence Radiation Laboratory, to List, November 20. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-105 [OUO].	Plowshare	Pre-Vintage	
VIP Visitors - Pre-Gondola II	[1966]		"VIP Visitors - Pre-Gondola II." Table. On file at: Fort Peck Archives, U.S. Army Corps of Engineers, Fort Peck, MT, Box 935.	Plowshare	Pre-Gondola	
Voorhees, James D.	1974	07/17	Letter with Encl. (Letter from David F. Morrissey, Colorado General Assembly, to Edward Teller, July 16) from James D. Voorhees, Law Offices Moran, Reidy & Voorhees, Denver, CO, to Milford Lee et al., July 17. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-026.	Plowshare		General, CO Amendment
Voorhees, James D.	1974	07/25	Letter with Encls. (letter to David F. Morrissey, July 25, and rough draft Amendment No. 10) from James D. Voorhees, Law Offices Moran, Reidy & Voorhees, Denver, CO, to Edward Fleming et al., July 25. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-026.	Plowshare		General, CO Amendment
Vortman, L. J.	1963	06/00	Cratering Experiments with Large High-Explosive Charges. <i>Geophysics</i> , Vol. 28, No. 3, pp. 351-368, June.	Plowshare		Phenomenology
Vortman, L. J.	1968	09/00	Crater Formed by Detonating a Row of Charges Beneath a Ridge. Sandia Laboratories, SC-RR-68-449, Albuquerque, NM, September. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-091.	Plowshare		Phenomenology Row Charge
Vortman, L. J.	[1968]		Close-In Airblast from Buried Row Charges. Manuscript, Underground Physics Division, Sandia Laboratories, Albuquerque, N.M. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-092.	Plowshare		Excavation, Phenomenology Cratering, Row Charge

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Vortman, L. J.	1970	11/00	Airblast from Project Tugboat Detonations. Sandia Laboratories, Report No. SC-RR-70-541, November. Albuquerque, NM. Note: Document location?	Plowshare	Tugboat*	
Vortman, L. J.	1971	06/00	Airblast from Project Trinidad Detonations. Sandia Laboratories, Report No. SC-RR-71-0056, June. Albuquerque, NM. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Trinidad	
Vortman, L. J.	1971	12/00	Craters in White Sands Alluvium from Surface-Burst Hemispheres. Sandia Laboratories, Report No. SC-RR-71 0864, December. Albuquerque, NM. On file at: Archives and Research Center, Lawrence Livermore National Laboratories, Livermore, CA, File PLO-092.	Plowshare	Near Surface Cratering Experiments	
Vortman, L. J.	1972	03/00	Ejecta from a Row-Charge Cratering Explosion. Sandia Laboratories, Report No. SC-RR-72 0001, March. Albuquerque, NM. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-092.	Plowshare	Tonopah 211	
Vortman, L. J.	1972	10/00	Airblast from Sequenced Explosions of Charges Horizontally Dispersed in Three Vertical Layers. Sandia Laboratories, Report No. SC-RR-72 0517, October. Albuquerque, NM. On file at: Archives and Research Center, Lawrence Livermore National Laboratories, Livermore, CA, File PLO-092.	Plowshare	Old Reliable Mine	
Vortman, L. J.	1972	12/00	Project Middle Course II Airblast and Surface Motion. Sandia Laboratories, Report No. SC-RR-72-0342, December. Albuquerque, NM. On file at: Archives and Research Center, Lawrence Livermore National Laboratories, Livermore, CA, File PLO-092.	Plowshare	Middle Course, Trinidad	

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Wagner, R. L.	1976	09/00	ESSEX - Diamond Ore Research Program: Test Execution Report - ESSEX I, Phase 2, Nuclear Cratering Device Simulation (Project ESSEX). Defense Nuclear Agency, Report DNA PR 0025, Washington, D.C.; U.S. Army Engineer Waterways Experiment Station, Report WES MP N-76-12, Vicksburg, MS, September.		ESSEX	
Wall Street Journal	1967	09/20	Indiana Standard Patents Shale Oil Recovery Plan. <i>Wall Street Journal</i> , September 20. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare		General, Oil
Wall Street Journal	1969	09/25	Harbor on North Slope Dug by Nuclear Blast is Mulled, Teller Says. <i>Wall Street Journal</i> , September 25. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-074.	Plowshare	North Slope Harbor	
Wallsterdt, R. W.	1966	02/11	"Payette Site Selection." Memo from R. W. Wallsterdt to G. C. Werth, February 11. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-031.	Vela Uniform	Payette	
Walter, R. A., C. M. Bloomster, and S. E. Wise	1975	05/00	Thermodynamic Modeling of Geothermal Power Plants. Battelle Pacific Northwest Laboratories, Report No. BNWL-1911, May. Richland, Washington. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Geothermal Power	
Warden, Fred F., and Thomas M. Tami	1971	03/00	Feasibility of Constructing a Military Harbor Using Nuclear Explosives. Lawrence Radiation Laboratory, U.S. Army Engineer Nuclear Cratering Group, <i>NCG Technical Memorandum</i> No. NCG/TM 70-12. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-092.	Plowshare	South Point Harbor	
Warner, D.			Project Payette. University of California, Lawrence Livermore National Laboratory, <i>Report UCRL-124988</i> ; 10150. Livermore, CA.	Vela Uniform	Payette	
Washington Post	1968	01/27	A-Device Lofts 2000-Foot Cloud. <i>Washington Post</i> , January 27.	Plowshare	Cabriolet	
Bulletin			"Area Map Projects WASP and Wagon Wheel." Map (JAB-99-68). On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Wagon Wheel, WASP	

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Wasp Area - Large Scale Map			"WASP Area - Large Scale Map." On file at: Engineering Records Library, Nevada Test Site, Mercury, NV.	Plowshare	Wagon Wheel, WASP	
Wasp Area - Large Scale Map (Merna Site)			"WASP Area - Large Scale Map (Merna Site)." On file at: Engineering Records Library, Nevada Test Site, Mercury, NV.	Plowshare	Wagon Wheel, WASP	
Watson, R. D.	1968	12/20	"Peaceful Uses of Explosive Power ' Atomic' Energy." Letter from R. D. Watson, College of Agriculture, University of Idaho, to Gary H. Higgins, December 20. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare	Surface Basalt Fracturing	
Webster, Harry T., Joel C. Bradshaw, and Louis M. Swartz	1977	03/00	Aircraft Shelter-Dice Throw Data Report. Report to Defense Nuclear Support Agency, Washington, D.C. from Air Force Weapons Laboratory, Report AFWL-TR-77-1, Kirtland Air Force Base, NM, March.		Dice Throw	
Weed, Robert C.	1974	05/03	Letter from Robert C. Weed, The Anaconda Company, Tucson, AZ, to Dixie Lee Ray, May 3. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-088.	Plowshare	Copper Ore Chemical Mining	
Weinberger, Leon	[1964]		Note from Leon Weinberger, Chief of Research under McCallum, to 'Jerry.' On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-100.	Plowshare	Lake Tahoe Sewage	
Wells, Robert L.	1958	05/16	"Proposal for the Utilization of Heat from Underground Nuclear Detonations." Letter from Robert L. Wells, Westinghouse Electric Corporation, Atomic Power Department, to Harold A. Fidler, May 16. On file at: Archives and Records Office, Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900157, 7/18.	Vela Uniform	Cowboy, Nuclear Explosive Power Generation	
Werth, Glenn C.	1963	03/27	"ARPA Nuclear Shot Series." Memo from Glenn C. Werth, Lawrence Radiation Laboratory, to Roger Batzel and Gary Higgins, March 27. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-027 [OUO].	Vela Uniform	Dribble	General
Werth, Glenn C.	1964	04/14	Underground Applications and Industry Interest Presentation Plowshare Advisory Committee, April 14, 1964. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029 [OUO].	Plowshare	Copper Recovery	General, PAC, Applications, Caving, Copper, Gas, Oil

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Werth, Glenn C.	1964	04/20	Letter from Glenn C. Werth, Lawrence Radiation Laboratory, to William R. Hardwick, April 20. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-086.	Plowshare	Copper Recovery	
Werth, Glenn C.	1965	01/13	Illustrations for Special Studies Presentation to Plowshare Advisory Committee Meeting, January 12 and 13, 1965. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		General, PAC
Werth, Glenn C.	1966	09/28	Memo from G. C. Werth, Lawrence Radiation Laboratory, to M. M. May, September 28. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-029.	Plowshare		General, NCG
Werth, Glenn C.	1967	01/31	Letter from Glenn C. Werth, Lawrence Radiation Laboratory, to John F. Philip, January 31. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-011.	Plowshare	Dragon Trail	
Werth, Glenn C.	1967	02/03	Program Activities for Plowshare. University of California, Lawrence Livermore National Laboratory, <i>Report UCRL-124785</i> , February 3. Livermore, CA. On file at: Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Bronco, Copper Recovery, Dragon Trail, Ketch , Pre-Schooner, Sloop	General
Werth, Glenn C.	1967	02/28	Letter with Encls. (letter from H. Clyde Davis to Glenn Werth, January 30, and letter from Glenn Werth to Clyde Davis, February 9) from Glenn C. Werth, Lawrence Radiation Laboratory, to John F. Philip, February 28. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-087.	Plowshare	Copper Recovery	
Werth, Glenn C.	1967	03/13	Plowshare Program Goals. University of California, Lawrence Livermore National Laboratory, <i>Report UCRL-126674</i> , March 13. Livermore, CA. On file at Technical Reports Library, Lawrence Livermore National Laboratory, Livermore, CA.	Plowshare	Cabriolet, Dragon Trail, Ketch, Sloop	
Werth, Glenn C.	1967	08/00	Letter (draft) from Glenn C. Werth, Lawrence Radiation Laboratory, to Joseph M. Feutsch. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-087.	Plowshare	TTR	
Werth, Glenn C.	1967	10/12	Management of the Plowshare Program with Particular Emphasis on Underground Engineering. Manuscript, Lawrence Radiation Laboratory, October 12. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare		General

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Werth, Glenn C.	1968	02/29	"Gold Leaching." Memo from Glenn Werth, Lawrence Radiation Laboratory, to File, February 29. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-098.	Plowshare	Gold Leaching	
Werth, Glenn C.	1968	03/07	"The Following Information Concerning Gold Leaching Studies at LRL." Telex from Glenn C. Werth, Lawrence Radiation Laboratory, to John S. Kelly, March 7. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-098.	Plowshare	Gold Leaching	
Werth, Glenn C.	1968	07/09	Letter from Glenn C. Werth, Lawrence Radiation Laboratory, to John S. Kelly, July 9. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-065.	Plowshare	Excavator, Travois	
Werth, Glenn C.	1968	09/00	"Plowshare Program Status Report." Notes from Glenn C. Werth, Division of Peaceful Nuclear Explosives, U.S. Atomic Energy Commission, September. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-118.	Plowshare	Aquarius	
Werth, Glenn C.	1968	09/10	"Alternate #1, Tentative Schedule – Plowshare Program – LRL Related." Schedule from Lawrence Radiation Laboratory, September 10. On file at: Archives and Records Office, Lawrence Berkeley National Laboratory, Berkeley, CA, File 434-900205, 28/48.	Plowshare, Vela Uniform	Bronco, Dragon Trail, Galley, Gondola, Phaeton, Pre-Gondola, Rockaway, Travois, Yawl	
Werth, Glenn C.	1968	09/10	"Alternate #2, Tentative Schedule - Plowshare Program - LRL Related." Schedule from Lawrence Radiation Laboratory, September 10. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-118.	Plowshare, Vela Uniform	Bronco, Dragon Trail, Galley, Gondola, Phaeton, Pre-Gondola, Rockaway, Travois, Yawl	General, Schedule
Werth, Glenn C.	1969	01/17	Letter (draft) from Glenn C. Werth (prepared by Gary H. Higgins) to William R. Cooper, January 17. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-032.	Plowshare	Wagon Wheel	

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Werth, Glenn C.	1969	06/00	Extract from University of California, Lawrence Radiation Laboratory, <i>Report UCRL-50968</i> , June. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare		Phenomenology
Werth, Glenn C.	1969	08/13	Planned Applications of Peaceful Nuclear Explosives. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-71901</i> , August 13. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-037.	Plowshare	Dragon Trail, Wagon Wheel, WASP	Applications
Werth, Glenn C.	1969	12/30	"Actions Related to Placing the Yawl and Galley Projects in an Indefinite Deferred Status." Telex with Encl. ("Analysis of FY 1970 Plowshare Program Financial Plans") from Glenn C. Werth, Lawrence Radiation Laboratory, to John S. Kelly, December 30. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-072.	Plowshare	Galley, Yawl	
Werth, Glenn C.	1970	06/12	"Weingart Memo re: ELS, etc." Memo from Glenn C. Werth, Lawrence Radiation Laboratory, to Frank S. Eby, June 12. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare		General, Device Development
Werth, Glenn C.	1971	01/25	Letter from Glenn C. Werth, Lawrence Radiation Laboratory, to John S. Kelly, January 25.	Plowshare	Modesto Waste Disposal, Lake Tahoe Sewage, Livermore Valley Sewage	
Werth, Glenn C.	1971	02/17	Effect of Nuclear Explosive in Oil Shale. In <i>Symposium on Oil Shale Retorting and Project Utah</i> , pp. 95-128, Western Oil Shale Corporation, February 17. Laramie, WY. On file at: Technical Library, National Nuclear Security Administration, Nevada Site Office, Las Vegas, NV.	Plowshare	Utah	
Werth, Glenn C.	1971	06/21	Status of Contained Nuclear Explosive Applications. University of California, Lawrence Radiation Laboratory, <i>Report UCRL-51074</i> , June 21. Livermore, CA. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-103.	Plowshare	Red Lake, Copper Ore Chemical Mining, Radioactive Waste, Utah, Wagon Wheel	Applications, Mining, Gas Stimulation, Oil, Copper, Gas Storage, Radioactive Waste, Geothermal

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Werth, Glenn C.	1971	10/06	"Considerations Concerning Plowshare Explosive Prices." Memo from D. C. Sewell, Lawrence Radiation Laboratory, to G. C. Werth, October 6. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-030.	Plowshare		General, Cost
Werth, Glenn C.	1971	12/03	Letter from Glenn C. Werth, Lawrence Radiation Laboratory, to John S. Kelly, December 3.	Plowshare	Wagon Wheel	General, Correspondence
Werth, Glenn C.	1972	02/15	"On February 17 We Received a Letter from DuPont." Telex from Glenn C. Werth, Lawrence Radiation Laboratory, to John S. Kelly, February 15. On file at: Archives and Research Center, Lawrence Livermore National Laboratory, Livermore, CA, File PLO-087.	Plowshare	Old Reliable Mine	
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