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Demolition Plan

Clauss-DP-001

University of California - Lawrence Berkeley National Laboratory

Building 51 and Bevatron Demolition, Deactivation and Disposal

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Applicability: Building 51 and Bevatron Demolition, Deactivation and Disposal

Revision No. 0

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1.0 Purpose

The purpose of this Demolition Plan (DP) is to document the proposed project execution approaches and methods, consider available demolition methodologies, and provide the appropriate details which when followed, will ensure site preservation, stability, and availability for future use with minimum site preparation and/or restoration. This DP was used to establish the project baseline budget and schedule approved by the Lawrence Berkeley National Laboratory (LBNL) and DOE.

This plan only addresses the engineering aspects of demolishing the structure, contents floors, and foundations of Building 51 and attached structures. Other considerations such as specific Safety and Health requirements are addressed in other Project documents.

The Building 51 and Bevatron Demolition Project only covers the area under the Building 51 and 51A footprint. This includes the roof, office area, generator room, Bevatron, electrical equipment room, fan room, cooling tower, tunnels, and foundations. The paved area of the former External Proton Beam (EPB) Hall, tunnels, ditches in that area, site lighting other than that attached to project buildings, project building parking areas and adjacent exterior stairways are not part of the scope of this project. The paved area of the EPB Hall will be used for project traffic, parking, staging, and shipping.

This DP is to be used as guidance in identifying structural issues and associated risks with the demolition of Building 51 and the Bevatron. Specific task planning will be implemented through the Integrated Work Document Process (IWD) and in some cases additional written sequencing procedures. These documents will be prepared on an as needed basis throughout the execution of the contract work. These documents will be reviewed and approved through LBNL.

2.0 References

- Drawing S-1, Final Site Configuration (Appendix 3)
- Drawing S-2, Foundation Structural Demolition Sequence (Appendix 4)
- Drawing S-3, Roof Demolition Sequence (Appendix 5)
- Drawing S-4, Subsurface Drain Pipe Rerouting (Appendix 9)
- Mechanical Deactivation Plan, Revision 0, June 25, 2008
- Electrical Deactivation Plan, Revision 1, February 25, 2009
- LBNL Facilities Division B51 and Bevatron Demolition Plan, June 26 2008
- Surface Water Handling Plan - April 21, 2008
- LBNL Drawing 3L1931B, Bevatron Magnet Terminology
- Reconnaissance Level Characterization Report (RLCR), Lawrence Berkeley National Laboratory, Bevatron Closure Project, Building 51, Revision 2, February 22, 2007
- LBNL Drawing 4B0001041, Topographic Quadrangle (CAD file "OldQSheets.DWG" held by LBNL Facilities D&C)
- LBNL Drawing 4B51C182, Storm Drain Modifications – Phase 2 (CAD file "CurrentTopo+Storm.dwg" held by LBNL Facilities D&C)
- Waste Management Plan, SEC-WM-001 Rev 0

3.0 General Demolition Approach

3.1 Background

Building 51, constructed in the early 1950s, houses the Bevatron accelerator, which ceased operation in 1993. The accelerator is approximately 120 feet in diameter (not including shield blocks), and built from 12,000 tons of steel and other metals. In the early 1960s, the floor and support areas were upgraded for the current shielding blocks by adding additional pilings and a thicker floor. Approximately 13,500 tons of concrete shielding blocks presently encircle the Bevatron at an outside diameter of approximately 150 feet. The building is of steel-frame construction with reinforced concrete slabs and foundations. Exterior building sheathing is composed of Transite (asbestos) paneling and the roof is 2 inch redwood tongue and groove with rolled roofing material anchored and sealed with mastic. Asbestos has been confirmed in the roofing and/or mastic materials. The building is approximately 125,000 square feet.

The building and its contents are in poor condition and asbestos and other hazardous materials typically used in construction during the time when the structure was built are present in the building.

On the west side of the building is an asphalted space of approximately 60,000 square feet where the EPB Hall was demolished several years previously. This area will be used for staging demolition materials, equipment, and waste for shipment.

Around the Building 51 area and presently within the perimeter of the building are several Environmental Restoration (ER) program wells and treatment units that require ongoing access by LBNL ER personnel periodically during the life of the project.

3.2 Safety Considerations

The following general controls and approaches will be used to ensure that project activities are conducted safely, with minimum risk of hazardous material exposure or injury:

- Perimeter fencing and positive controls limiting access to authorized personnel and equipment.
- Use of large heavy equipment for demolition activities as much as possible to minimize hands on/personal contact methods of demolition. This primarily includes large track excavators with boom mounted shears, hoe-rams, or clam buckets
- Use of trained and qualified coordinators/spotters to direct and control equipment traffic, lifting activities, and heavy equipment demolition activities.
- Use of trained and qualified riggers in all lifting operations.
- Use of water spray for dust suppression.
- After removal of building shell, containment of surface water to meet storm water permit requirements.
- Shipment of concrete shield blocks on standard flatbed or drop deck trailers.
- Disassembly of the Bevatron into the largest sections that can be reasonably shipped intact and meet Department of Transportation (DOT) requirements.

- Use and maintain fire watches when dissembling Bevatron. Magnet Coil and Cryogenics insulation may be flammable.
- Removal of asbestos or asbestos containing material (ACM) prior to demolition of the building structure
- Removal or fixing of chemical or radioactive hazards to prevent unintended exposure, prior to demolition of the building structure.
- Prevent access to the building interior by any person after demolition of the B51facility structure has started. Access to interior areas of B51 may be granted after removal of B51A and/or the structure that houses the mechanical areas, only after inspection by the Clauss Construction's engineer and safety professional.

Each activity will be specifically evaluated to ensure that all hazards are identified and appropriate controls are established to ensure the safe conduct of the activity.

3.3 Preparation for Demolition

Clauss Construction has developed this demolition plan taking into consideration the concerns, issues and guidance discussed in the LBNL prepared Demolition plan and the specifications provided in the Request for Proposal. This demolition plan was prepared under the direction of the Clauss Construction Structural Engineer registered in the State of California and documents the engineering evaluations and validates the selected methods, processes and procedures.

Prior to any demolition activities, several specific actions are required

3.3 1 Project Site Considerations

A site plan drawing in Appendix 6 shows the following:

- The boundary of the project (Appendix 8, Project Fencing and Access, indicates an LBNL previously proposed boundary plan with fences and gates),
- Location of existing fences and planned project fence line,
- Location of storm water diversion fences, dikes, or sand bags,
- Location of ER wells and treatment units,
- Roadway access to the site, and modifications, if required, to the traffic island at Lawrence/Alvarez circle,
- Layout of truck staging and loading areas,
- Designated parking areas,
- Pedestrian entry and control points,
- Location of Demolition Subcontractor temporary trailers, and
- Location of LBNL office trailer and Conex storage containers.

The area west of Building 51 will be evaluated by the Structural Engineer and trench covers and/or tunnels will be temporarily reinforced as necessary to withstand demolition traffic and activities.

Prior to the B51 structure being demolished Clauss Construction as a contingency will design a water collection system to collect, store and treat (as necessary) all surface water that falls or runs onto the project site. Since dust suppression must be performed by water spray and runoff has the potential to contain hazardous substances or contaminants, consideration shall be given for recycling or treatment

of dust suppression water to minimize the impacts of waste water discharge. Appropriate sampling points will be provided and State and local water quality standards and permit requirements will be met. Water discharge will be coordinated with State and local agencies and water treatment facilities. All water treatment and discharge permits will be obtained and met. The application for permits will be coordinated with or handled by LBNL's EH&S, specifically the Environmental Services Group. The design of the water collection system will be accepted by the LBNL Project Manager and EH&S groups. The approach to handling surface water is documented in the Surface Water Handling Plan and implemented in the SWPPP.

Clauss Construction will remove/re-route the Groundwater Treatment Systems for B51. The system will be removed from B51 basement and re-assembled in a portable connex box to allow placement outside of the building demolition boundary. The Mechanical Deactivation Plan provides the details of the removal/re-routing and a layout of the groundwater well locations. ER wells are vertical PVC pipes and will remain in operation during the abatement and demolition activities. They will be well marked, fenced off, and protected as necessary to prevent damage during the life of the project.

There are subsurface drain pipes that penetrate the east retaining wall from column line "4" through "10" and enter the building footprint. These drain pipes will be rerouted, collected, and new pipe installed to the 48" drain conduit north of the building footprint. The location and details of the subsurface drain pipe rerouting is shown on Appendixes 3 and 9.

There are a few historical and current waste water streams that will be generated and collected during D&D and restoration of the site. These include,

- Demolition dust suppression water
- Decontamination wash water (used to clean excavation equipment)
- Roof leak water
- Storage tank ingress water
- Concrete saw cutting water
- Rain and groundwater infiltration in excavation trenches
- Surface water

All of the above mentioned water sources have the potential of becoming in contact with radioactive materials or any of the California Hazardous, RCRA, or TSCA materials during the course of the project. Until open sources of contamination are appropriately removed, water incursions will require inhibition, contingency controls, isolation and sampling/monitoring, and analysis prior to discharge/disposition. Retaining the Building 51 structure during the Bevatron removal will eliminate much of the water concerns. However, while contact cross-contamination is probable, any water in-flow will need to be evaluated radiologically for volumetric release and final disposition.

Some liquid wastes generated during D&D activities may be liquids held up in existing piping. This includes liquids in process and sanitary piping under building contamination sites. After characterization, these liquids will be placed in bottles, bung drums, or pumped into a small portable tank for transfer to on-site liquid waste processing as described below or an alternate project approved treatment facility.

The final disposition of the water will be delineated according to the radiological and chemical characteristics. Pre-treatment, such as filtration and/or primary settling of solid/liquid mixtures may be necessary to remove radiological contaminants or to segregate solids from the liquids to apply correct criteria. This issue is further discussed in the waste management plan, SEC-WM-001 in section 6.6

3.3.2 Utilities and Cold & Dark

Utilities that cross the project area, either above or below ground, will be permanently relocated or run to circumvent the project area, or disconnected outside the project boundaries. The Clauss Construction and subcontractor work forces will perform the utility relocations or disconnects in accordance with the Clauss accepted LBNL Mechanical Deactivation Plan, Electrical Deactivation Plan, and associated drawings/maps. There will be a phased approach to utility deactivations associated with the fire protection and alarms systems. Fire water supply to the EPB Tunnels and B51F shall be maintained as detailed in the designs in the Mechanical Deactivation Plan and the Electrical Deactivation Plan.

Fire protection piping enters Building 51 through a tunnel connecting a former EPB Building tunnel on the west side. The fire protection isolation valve exits the EPB tunnel above ground near the Building 51 wall. This fire protection header also supplies the EPB tunnels. The EPB tunnel will require an isolation bulkhead and the fire protection supply and isolation relocated in the EPB tunnel with the Building 51 supply capped

NOTE: ***Fire protection will remain in place and active during preparations for demolition, including utility isolation; Fire protection will be isolated and capped as near as possible to the start of building structure demolition***

The fire sprinkler system in Trailer Building 51F will be maintained in operation throughout the demolition work. This will require modifications to the current method of monitoring the water flow signals and valve supervisory signals. In addition, the riser near "H" door will need to be either protected or relocated in a vault to allow for its safe continued operation.

The fire alarm system will have specific conduits marked so that it is clear that they are not to be removed during abatement work. This will allow for the continued operation of the fire alarm system during abatement work. The temporary fire alarm conduits will be colored red for easy identification. Alternate and temporary conductors may be installed. In particular temporary power will be maintained during Bevatron removal for 3 cranes (CR-1,2&3). Temporary power conduits will be colored green for easy identification.

The facility systems will be rendered "preliminarily deactivated" prior to any activities that involve cutting, drilling, shearing, sawing, or other active demolition activities. Deactivation means that the system can be verified as having no active energy source and has been isolated completely by way of air gapping on all ends of the system. Utilities and services as identified in the Mechanical (MDP) and Electrical Deactivation Plans (EDP), such as electrical, compressed air, sewer, water, and steam, will be cut and air gapped, capped if appropriate, or removed. No active demolition activities are to occur in an area until signoff by LBNL has been received in the EDP or MDP for systems that are affected by the demolition in that area Unknown piping that enters the facility will be researched, then air gapped and capped after proper identification has been made

The building will not truly be cold and dark until the fire systems and temporary power have been deactivated. Demolition of the cover structure will not occur until the building is cold and dark. The preliminary deactivation milestone will be met with the completion of the EDP and MDP with the exceptions described below

Parts of the EDP that are not associated with the preliminary deactivation, are ongoing activities following preliminary cold and dark, and will be completed prior to demolition of B51 are as follows:

a. Isolation of circuits 511A5A and 512A3A on switchgear 511A and 512A

b. Verification that the B51 panel boards are de-energized

c. Circuit and panel re-labeling

d. Re-routed electrical as-builts, and drawing updates

e. Removal of B51 paging system

f Removal of B51 data network equipment

g Isolation of B51 telecom circuits

h. Isolation of programmatic cabling between B51 and the EPB tunnels

i Isolation of the B51 fire safety system

Parts of the MDP that are not associated with the preliminary deactivation, are ongoing activities following preliminary cold and dark, and will be completed prior to demolition of B51 are as follows:

a. Isolation of Building 51 sanitary sewer from SSMH9N19E

b. Isolation of B51 roof drains from the SD system

c Isolation of storm drains

d. Isolation of the B51 fire water system

- Start at the west side collapsing building and roof structure, including crane rail and cranes. (Polar cranes will be positioned on the west side of building before starting any necessary structure weakening.)
- Continue cutting up structure and separating debris as excavators with shears work around the structure in both directions.
- Demolish the utilities structure housing electrical power facilities and air intakes at the north and east of the Bevatron, under approved IWD
- Leave floors that tie retention walls in place until walls are pinned or reinforced
- Remove Bevatron foundation system including pile caps and facility floor, under approved IWD.
- Demolish deep Approach Tunnel connecting to the north-west quadrant of the Bevatron
- Remove slabs and foundation for the Building 51 structure. Deeply buried caissons/piles can be left in place but must be surveyed and noted on the final site drawing (See 5.4).
- Complete pinning or reinforcing of retention walls, under approved IWD
- Remove foundation for the buildings north and east of the Bevatron
- Remediate under slab soil as required and backfill per specifications to 710' grade level and perform final grading as shown on Final Site Configuration drawing, Appendix 3

Some of the above structural components to be demolished incorporate site retaining walls that need to be left in place in order to assure the stability of the site slopes to the east and south of Building 51. Refer to the Foundation Structural Demolition Sequence drawing, Appendix 4. The exact sequence of work may be adjusted upon approval of the Clauss Structural Engineer and the LBNL Project Manager

4.0 Demolition Plan

4.1 Concrete Shielding Blocks for Bevatron

This is an annular structure of shielding blocks enclosing the Bevatron, with an outer diameter of approximately 150 feet. The outer wall consists of two rows of semi-interlocking concrete blocks with individual weights of up to 60,000 lbs. The inner wall is a reinforced poured in place concrete wall, 5 feet thick. The roof consists of reinforced concrete cap beams that are simply supported at each end on the walls.

Removal of shielding blocks will be performed using the 3 existing cranes (CR-01, CR-02 and CR-03). The two cranes over the Bevatron (CR-01 and CR-02) will be repaired where needed, have radio controls fitted onto them, and be recertified for use at LBNL and in the State of California. CR-03 is the crane located in 51A and will be used typically to move the blocks for staging, surveying and loading onto trucks. The following demolition methodology is to be followed for each removal operation:

a) Remove enough roof shielding blocks so as to allow removal of several of the top layer of wall shielding blocks, both inner and outer rows

b) Continue to remove roof and wall shielding blocks until free access is obtained to the second layer of wall shielding blocks

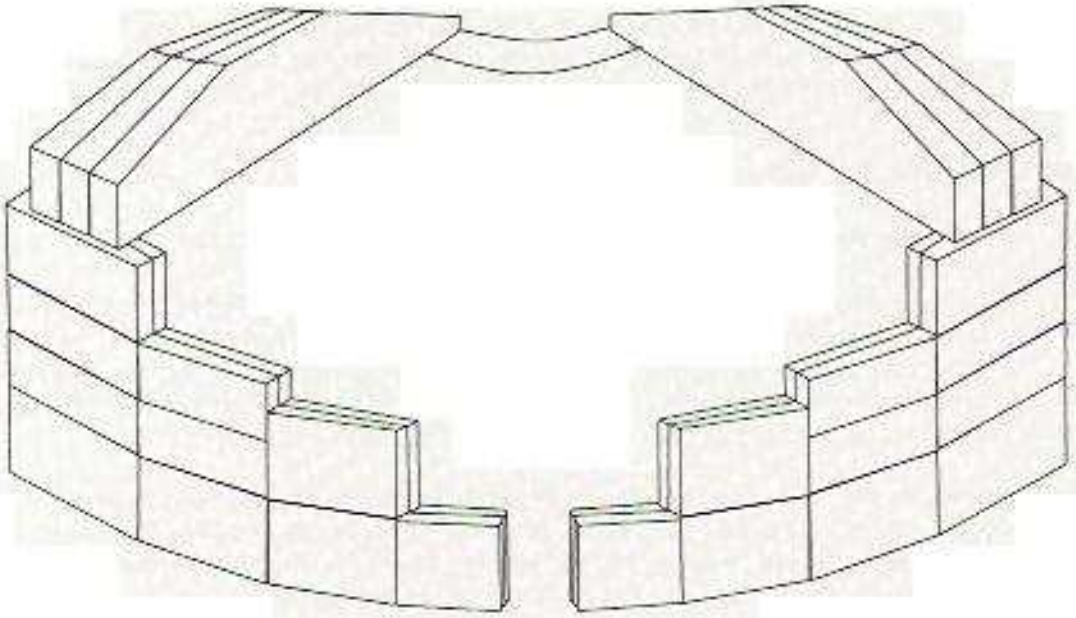
c) Remove any ACM materials that are contained between the stacked blocks per IWD controls.

d) Continue to remove roof and wall shielding blocks until a wedge shaped opening is made to the floor at the 710' elevation, see Sketch 1. Removal of "all" roof blocks prior to removing wall blocks will not affect the stability of the remaining wall blocks

The approach is considered at least as stable as removing the blocks by layer from the top down. The wall blocks are made with raised key areas that provide stability by being held by the adjacent wall blocks. The roof blocks are made similarly where they connect at the top of the wall assembly and thus provide additional stability with their weight and key to the wall blocks. The excerpt from LBNL Drawing 4P4545B below illustrates the roof keys and part of the wall block keys.

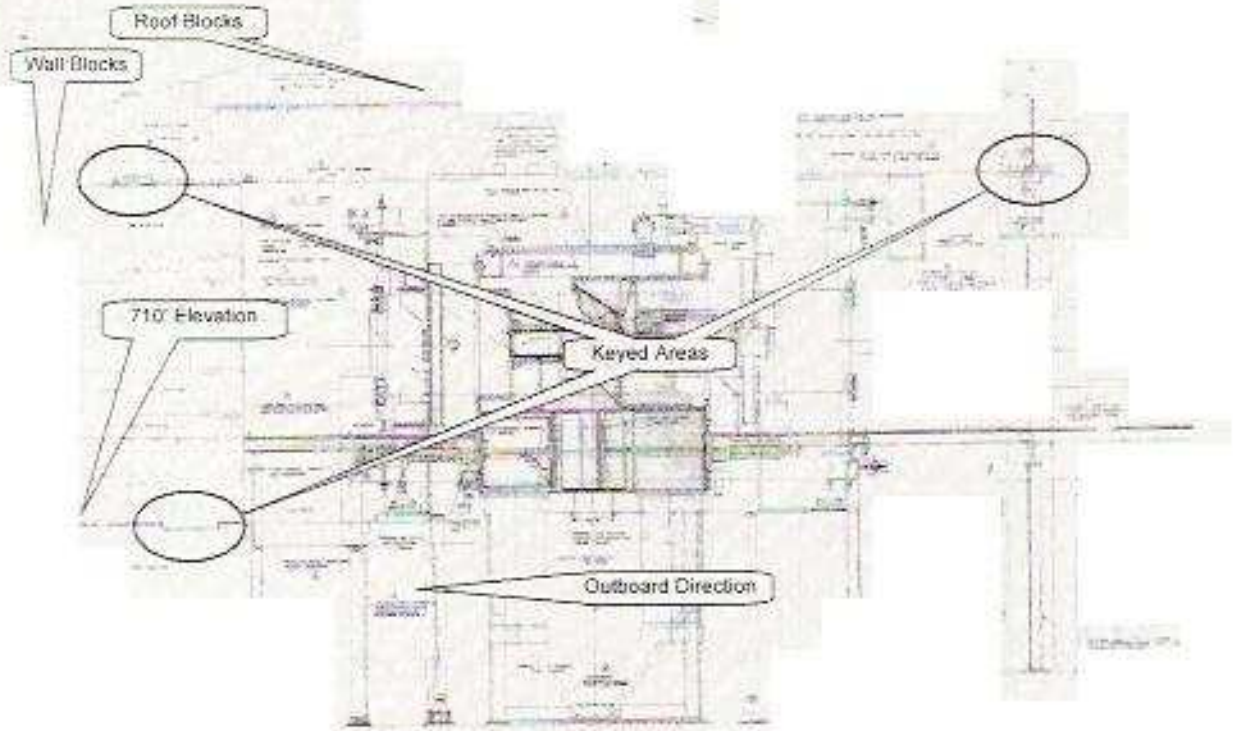
Clauss Construction shall validate this approach with a documented engineering evaluation. The engineering evaluation must be accepted by the LBNL Project Manager prior to start of demolition.

e) Continue to remove roof and wall shielding blocks along the faces of the wedge opening until all shield blocks are removed.



Sketch 1 – (Bevatron not shown)

Shield Block Removal Scheme



LBNL Drawing 4P4545B Excerpt, West Tangent Area, End Section

The milestone for shield block removal will be met when all the shield blocks have been moved from their original position to a location in preparation for survey.

4.2 Bevatron Components

Tangent Tanks and Quadrant areas may be removed in any order. Clauss anticipates starting at quadrant 4 to identify hazardous and/or radiological materials and develop knowledge about the internal structure that is not available due to lack of process knowledge or specific drawings

LBNL Drawing 3L1931B is an out-of-date general drawing which contains a cross-section view of the Bevatron and defines terms that will be used in the following sections for demolition of the Bevatron. The cryogenics piping, panels, and crawl spaces are not shown on the drawing, but are evident in pictures. Pictures showing various aspects of the Bevatron are included in Appendix 1

CAUTION: Vertical clamp stud bolts, diagonal stays, and radial tie straps are under tension and may release suddenly or kick back if the tension is not relieved before cutting.

4.2 1 Quadrant Area Components

CAUTION. The following activities may uncover hazardous materials (e.g., lead, asbestos) and/or loose radioactive contamination. Activities will be conducted to minimize generation of dust or disturbance of unknown materials until Radiation Control Technicians (RCT) and Construction Safety personnel provide appropriate survey results or direction.

The methodology to dismantle the quadrant area components will be documented in an approved IWD and/or work sequence, the basic order of operations will include:

a) Loosen and cut vertical clamp stud bolts and diagonal stays OR mechanically remove same. (Appendix 1, Pictures 1, 4, 7)

b) Cut or mechanically remove tangent stays and any other attachments and remove the upper clamp beams (Pictures 1, 4, 7)

c) Cut or mechanically remove leg stops which tie the leg slabs to the upper and lower yoke slabs. (Pictures 1, 4)

d) Remove upper yoke slab core sectors

e) Relieve tension and cut radial tie straps and other radial rods and stays. (Pictures 3, 5)

f) Remove inner and outer leg slabs.

g) Demolish coil internal support radial tie frame to allow access to coil windings. (Pictures 2 3)

h) Cut or shear coil windings as needed and remove windings in sections. (Picture 3)

Caution: Magnet Coil insulation may be flammable

i) Remove upper pole bases and any other items surrounding the Beam Line/Cryogenics Line area. (Picture 2)

j) After several upper Pole Bases are removed, unbolt a section of the top stainless steel vacuum skin to expose the upper Pole Tips (one Pole Base bridges more than one Pole Tip), remove cryogenics panel and crawl space inside the vacuum envelope (not shown on Drawing 3L1931B), as accessible

NOTE: There are about 20 copper conductors with stainless covers, (Pole Face Windings) bolted to the face of the top and bottom Pole Tips that run around the ring, they should be visible where they bridge the Pole Tips and need to be cut before the Pole Tips can be removed.

CAUTION. Cryogenics Insulation may be flammable

CAREFULLY remove the Beam Line/Cryogenics Line cover and materials surrounding the beam line

k) Mechanically disassemble Beam Line components and cover & tape the ends of components

If there is not a way to mechanically disassemble Beam Line components, the Beam line may be sheared or cut under the direction of RCTs to minimize the spread of any contamination.

l) Remove lower pole

m) Remove lower yoke slab

n) Cut or mechanically remove tangent stays and any other attachments and remove the lower clamp beams.

Repeat above steps as needed to complete demolition of Bevatron in quadrant areas.

4.2.2 Tangent Tank Area Components

The east and south Tangent Tanks have entry port areas on the outboard sides where the coils are cantilever supported from the upper clamp steel support beams. See Picture 6 in Appendix 1. Clauss Construction will have to analyze the attachments and possibly provide temporary supports to enable safe disassembly/demolition of the coils in the Tangent Tank areas.

Use the following demolition methodology for the Tangent Tanks and attached equipment. An IWD will be prepared for this task:

NOTE: It is suggested that the following order be followed for removing the Tangent Tanks: West, North, South and East. This is based on the amount and complexity of equipment inside, from least to most.

a) Remove coils from each end of the Tangent Tank.

b) Remove piping, pumps, electrical, and other equipment attached to the Tangent Tanks. (Pictures 8, 9, 10)

c) Mechanically remove Tangent Tank steel cover panels. (Picture 8)

d) Mechanically remove Tangent Tank internal equipment.

e) Remove Tangent Tank frame and support structure.

Repeat above steps as needed to complete demolition of Bevatron Tangent Tank areas.

The milestone for Bevatron removal will be met with the complete removal of the tangent tanks and quadrant area components within the dashed lines as shown in the Appendix 1 Page 8 section diagram. Completing waste management activities of the Bevatron materials, e.g., surveying, packaging, transportation, and disposal, is not needed to meet the milestone.

4.3 Building 51 Weather Structure and Attached Office Areas

The primary part of this structure is circular with a diameter of approximately 220'. This circular structure houses the Bevatron. A steel column at its center supports radial trusses, which in turn are supported at the other end by columns regularly spaced around the perimeter.

Roofing materials that contain asbestos will be removed prior to demolition as well as materials requiring removal to meet hazardous material or waste regulations or requirements.

With the exception of a) below, all demolition activities are to be conducted using heavy equipment and excavators with appropriate heavy duty shears, grapples, or other boom mounted tools.

The two polar cranes and crane rails will be collapsed to the floor with the building structure. They will be positioned at the west side of the building so they can be removed as part of the first demolition operations. Size reduction and movement of the crane bridge and trolley debris will be performed on the ground with excavator mounted heavy shears. Some pieces may be too large for a shear to cut, in these cases the large piece will be dragged by excavator to a clear work area, be stabilized to avoid unintentional turning, and workers will size reduce by torch cutting into the largest size possible.

Since the building radial trusses are simply supported at both ends, the following demolition methodology is to be followed. An IWD will be prepared for this task.

a) Weaken the joints connecting the radial trusses of Building 51A at the Building 51 wall by partially cutting or shearing at the joint as approved by a Professional Structural Engineer licensed in California, see appendix 11

b) Weaken the outer perimeter columns of Building 51A by partially cutting or shearing as approved by a Professional Structural Engineer licensed in California.

c) Shear the outer perimeter columns of Building 51A and pull the columns outward until the roof collapses. Demolish roof and trusses, size reduce, and load or move demolished material away from primary activity area. B51 is still in a stable state and may be entered upon approval by a Professional Structural Engineer licensed in California, the LBNL Construction Safety Professional, and the Project Safety Professional.

d) While the 51A material is being processed (and if deemed necessary by the demolition crew) weaken the joints connecting the radial trusses at the center column by partially cutting or shearing at the joint as approved by a Professional Structural Engineer licensed in California.

e) Make sure safety procedures have been developed to address the risks associated with the open Bevatron Pit.

f) Shear the perimeter columns of Building 51 near the base and pull the columns outward until the roof section/sector starts to collapse onto the floor

g) Continue to pull and twist columns and trusses until a minimum of one-third (1/3) of the roof is resting on the floor.

h) Demolish roof and trusses, size reduce, and load or move demolished material away from primary activity area.

i) As the demolition area is stabilized, continue to pull the roof trusses to the floor area until the entire structure has been collapsed, size reduced and segregated into waste streams and/or loaded for transport to waste repositories

The milestone for structure demolished will be met when both the exterior abatement and structural demolition has been completed. Exterior abatement includes all ACM and lead not removed as part of the interior abatement milestone. Demolition is characterized by the removal from its original location all items supported by steel columns down to top of concrete slab.

4.4 Utilities Structure housing electrical power facilities and air intakes at the North and East of the Bevatron

This rectangular structure is approximately 160' long by 80' wide aligned in the north-south direction and is structured with steel frames in the east-west direction at an average of approximately 21' on center.

Certain hillside retaining walls in this structure depend on the floor slabs at ~710' and ~725' elevations for structural integrity. These walls (See **4.8.2** below) will require reinforcing prior to demolition of the floor slabs tying the walls together.

In addition walls connected to retaining walls may provide structural support to the retaining walls. Clauss Construction will perform an engineering evaluation of all walls connecting to retaining walls to ensure that removal will not undermine the integrity of retaining walls. The engineering evaluation will be a separate document and shall be accepted by the LBNL Project Manager prior to demolition of connecting walls.

Reinforcing will be specifically designed in such a way that their slope retaining capability is maintained. Acceptable solutions included buttresses or tie backs through the wall into the hillside. The proposed engineered solution must be accepted by the LBNL Project Manager prior to installation.

Refer to the Foundation Structural Demolition Sequence drawing, Appendix 4, for specific demolition sequencing to follow for the floor slabs and walls in this area

The following demolition methodology is to be followed:

a) Shear the outside columns near the base and pull the column outward until the roof section/sector starts to collapse onto the floor.

b) Continue to pull and twist columns and trusses until a minimum of one-third (1/3) of the roof is resting on the floor

c) Demolish roof and trusses, size reduce, and load or move demolished material away from primary activity area

d) As the demolition area is stabilized, continue to pull the roof trusses to the floor area, size reduce, and load or move demolished material away from the primary activity area until the entire structure has been collapsed, size reduced and segregated into waste streams and/or loaded for transport to waste repositories.

e) Prior to demolishing floors tying the walls noted in **4.8.2** below, install engineered reinforcement. Saw cut the floor slabs along the walls to prevent damage to the walls from floor demolition activity.

f) Continue demolition until the entire structure has been collapsed, size reduced and segregated into waste streams and/or loaded for transport to waste repositories.

4.5 Bevatron Foundation System Including Pile Caps and Facility Floor

The Bevatron foundation system includes heavy concrete elements arranged along a circular shape, supported along several circles by caissons and piles. The outside diameter of this arrangement is approximately 150'.

The following demolition methodology is to be followed:

a) Demolish and remove floor slabs using heavy equipment.

b) Demolish and remove foundation components, including the piles/caisson caps grade beams. (deep piles and caissons may be sheared off with the location of the remaining buried parts recorded on the final drawing).

c) Backfill and compact the excavated areas to final grade per specifications.

4.6 Deep Approach Tunnel Connecting to the North-West Quadrant of the Bevatron

This deep tunnel is located at the north-west quadrant of the Bevatron as shown on LBNL Drawings 5N51F078 and 5N51S079. The tunnel is 8 feet in diameter approximately 110 feet long, and constructed of steel reinforced concrete inside a steel cylinder. The bottom of the tunnel is approximately 22 feet below grade.

The following demolition methodology is to be followed:

a) Remove all equipment, cables, and piping from the tunnel. Permanently mounted structural elements may remain (e.g., stairs, hangers, and embedments) and will be demolished with the tunnel.

b) Safely excavate to the tunnel using methods approved by a qualified safety professional (e.g. shoring, benching, sloping, etc.).

c) Demolish the tunnel and remove the tunnel manhole entrances and remaining steel structural elements, and debris.

d) Backfill and compact the excavated areas to final grade per specifications.

4.7 Foundation for the Building 51 Structure

Special attention must be paid not to demolish the foundations for the retaining walls to be left in place. Refer to the Foundation Structural Demolition Sequence drawing S-2 (Appendix 4) for the retaining walls to be left in place.

In addition walls connected to retaining walls may provide structural support to the retaining walls. Clauss Construction will perform an engineering evaluation of all walls connecting to retaining walls to ensure that removal will not undermine the integrity of retaining walls. The engineering evaluation shall be accepted by the LBNL Project Manager prior to demolition of connecting walls.

The following demolition methodology is to be followed

a) Demolish and remove tunnels and foundation components, including any pile/caisson caps, grade beams and shallow caissons,

b) Block tunnel connecting EPB tunnels with Bevatron with a bulkhead near the branch that provides Fire Protection entrance to the EPB tunnels as shown on drawing S-2. An engineered solution for the tunnel bulkhead will be submitted by Clauss Construction and accepted by the LBNL Project Manager prior to placement.

c) Demolish and remove the portion of the EPB connecting tunnel inside the project boundary

d) Backfill and compact to final grade per specifications

4.8 Foundation for Buildings North and East of Bevatron

Refer to the Foundation Structural Demolition Sequence drawing S-2 (Appendix 4) for the sequence of foundation demolition. Special attention must be paid not to demolish the foundations for the retaining walls to be left in place.

The following demolition methodology is to be followed.

a) Demolish and remove foundation components, including any pile/caisson caps, grade beams and shallow caissons,

b) Backfill and compact to final grade per specifications

4.8.1 Retaining Walls East and South of Bevatron

As shown on drawing S-2, the following walls are essential for the stability of the slopes at the site, and are therefore to be left in place:

- Retaining wall along circular gridline "C" from gridline "2" through "6".
- Retaining wall along radial gridline "6" from gridline "C" to "E".
- Retaining wall along circular gridline "E" from gridline "6" through "18".
- Retaining wall along radial gridline "18" from gridline "E" out and including the angled retaining wall to the road.
- Concrete wall acting as a retaining wall along circular gridline "f" from gridline "18" to "19" Please see Wall Transition Detail, Drawing S-2 Appendix 4.

4.8.2 Retaining Walls North and East of Bevatron

As shown on drawing S-2, the following walls are essential for the stability of the slopes at the site, and are therefore to be left in place:

- Retaining wall along gridline "4" from gridline "Y" to "Z" (**).
- Retaining wall along gridline "Z" from gridline "4" to "7" (**).
- Retaining wall along gridline "7" from gridline "Y" to "Z" (**).
- Retaining wall along gridline "Y" from gridline "7" to "14".
- Retaining wall along gridline "14" from gridline "Y" to "Z" (**).
- Retaining wall along gridline "Z" from gridline "14" to "17" (**).
- Retaining wall along gridline "17" from gridline "Z" to "X" (**).
- North and east retaining wall, north of gridline "4"

The walls marked with (**) depend on the building for structural stability. These walls need to be reinforced before the building demolition as noted in **4.7** above.

Refer to drawing S-2 for specific demolition sequencing to follow in this area.

The milestone for foundations removed will be met when the deep tunnel, horizontal slab, grade beams, and caisson/pile capes are removed to meet the project objectives as defined by the LBNL Project Director and Project Manager. This milestone also includes the completion of any tie-backs or shoring for the remaining retaining walls as required. Excludes any portion of facilities to remain (i.e. retaining walls) as shown on drawing S-1 Final Site Configuration in Appendix 3 and caissons and piles.

4.9 Subsurface Utilites Removal

As part of the foundation removal scope, Clauss Construction will remove all utilities that have been isolated and/or abandoned within the B51 footprint (or as identified in the scope of work) as part of the execution of the EDP and MDP

Prior to initiating the removal of below-grade piping systems with excavation equipment a separate procedure for line investigation and removal of potentially contaminated pipes will be prepared and issued. This procedure will be reviewed and approved by LBNL and will address the following:

- To prevent a rise in the water table above the present basement level, existing drainage system piping will be protected from damage until the rerouted system (appendix 9) is installed.
- Potentially contaminated lines will be inspected to assess their integrity and to identify locations where past releases to the environment may have occurred.
- Potentially contaminated lines will be protected from damage during demolition activities and line removal to prevent the release of any contents to the environment.

5.0 Final State

5.1 Grading and Drainage

a) The Final Site Configuration drawing S-1, Appendix 3 shows the general arrangement and final state of the site.

b) The center area of the project will be backfilled and compacted to specifications. The site will be contour graded with drainage directed to a newly installed concrete drop inlet. Drainage is designed to prevent wet areas or standing water. Grading contours will intercept the existing asphalt area at the same elevation or slightly higher to prevent drainage back to the project area.

c) Install a precast concrete drop inlet with metal grate with solid 12" (min) PVC outfall pipe connecting to the existing catch basin approximately 160' east of the center of the Bevatron's original location as shown on drawing S-1

- Install filter cloth on top of the drop inlet box and hold in place with the metal grating
- Grade all disturbed-area surfaces to drain to the temporary drop inlet.
- Compact the entire disturbed-area surface by wheel rolling or tracking to ensure a firm surface to minimize absorption of rainwater
- Place two rings of continuous fiber rolls (waddles) within two feet of the edge of the drop inlet box and completely surrounding the drop inlet.
- Stake a silt fence within 2 feet of the outside ring of the fiber rolls.
- All grading and sloping of surface dirt will be performed in such a manner as to ensure proper flow of clean runoff water via the installed drainage system.

d) The areas above the retaining walls will remain as is with the existing parking areas, asphalt and concrete slabs These areas will not be backfilled or covered.

The milestone for Backfill Complete will be met with the completion of drain line changes and/or installation as described on drawing S-1 Final Site Configuration in Appendix 3 and the backfill, compaction, and rough grading to drain of the site. This item excludes any hydro-seeding or temporary storm water controls and the work to achieve final grade

5.2 ER Wells

- ER wells will be extended if necessary, above final grade

5.3 Site Cleanup

- All temporary Demolition Subcontractor facilities, trailers, and equipment will be removed and any parking or staging areas will be restored to their pre-project condition if damaged
- All project demolition debris and trash will be removed by Clauss Construction.

The milestone for Complete Mobilization will be met with the removal of all Clauss temporary construction facilities and the removal of all waste that is under Clauss Construction control off-site

5.4 Final Drawing

A drawing of the final site will be prepared by Clauss Construction to document:

- The location of tunnel components, structural components, foundation caissons, and foundations that are left in place;

NOTE: General designed locations on foundation components are shown on LBNL drawings:
5N51F078, Foundation Plan
5N51S014, Foundation Plan – East Half
5N51S015 Foundation Plan – West Half
5N51S026, Magnet Foundation Plan & Details
5N51S085, Foundation and Floor Plan
5N51S087 General Sections

- The final grading elevations and slopes; and
- Any modifications to the site approved by LBNL and made to enhance or expedite project activities or site access.

5.5 Safety Barriers

The retaining walls left in place present fall hazards after the facility is demolished and require safety barriers to be installed. Figures 1 and 2 provide the LBNL acceptable handrail arrangements. Handrails shall be installed at the top of all retaining walls left in place as defined in Sections 4.8.1 and 4.8.2. Handrail shall be painted with 1 coat of primer and 2 coats of Plochere color G-34 exterior enamel.

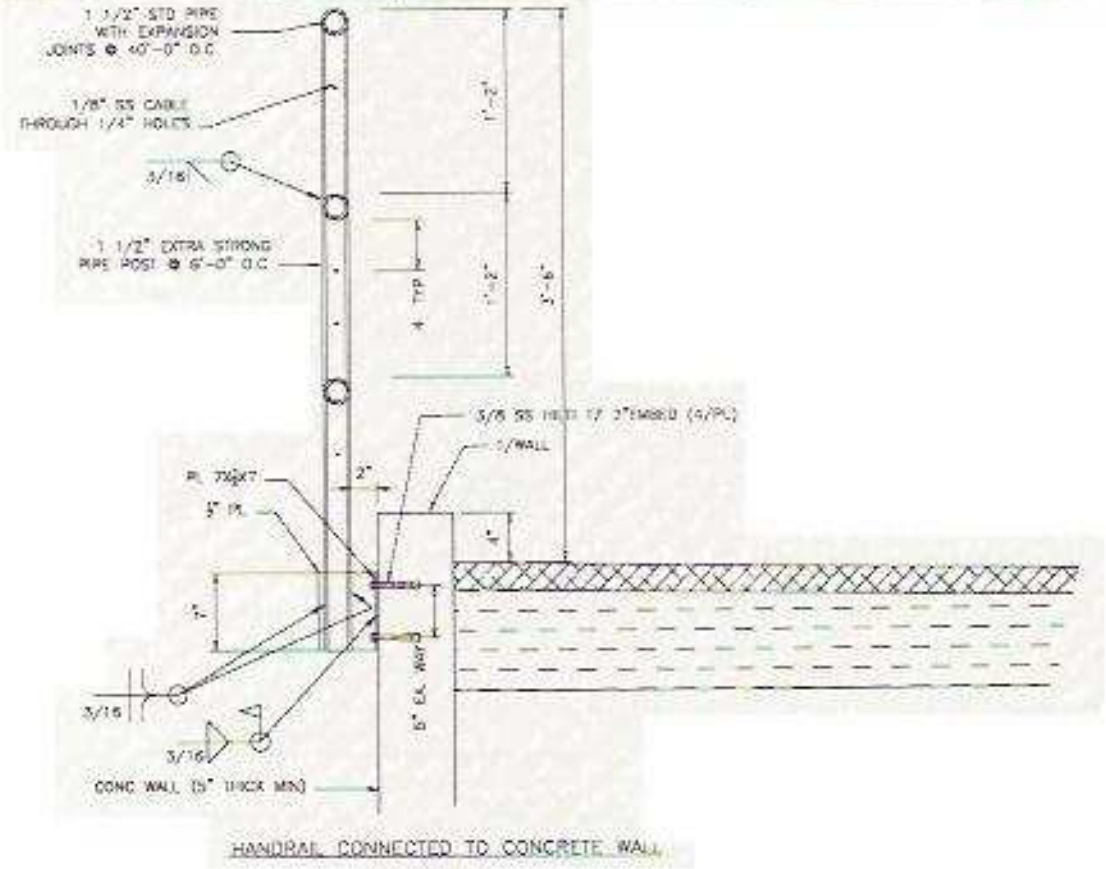

1 1/2" STD PIPE WITH EXPANSION JOINTS @ 40'-0" O.C
1/8" SS CABLE THROUGH 1/4" HOLES
3/16
1 1/2" EXTRA STRONG PIPE POST @ 6'-0" O.C
4 TYP
3'-6"
3/8 SS
2"
PL 7½x7
5" PL
4"
3/16
3/16
CONC WALL (5" THICK MIN)
HANDRAIL CONNECTED TO CONCRETE WALL

Figure 1

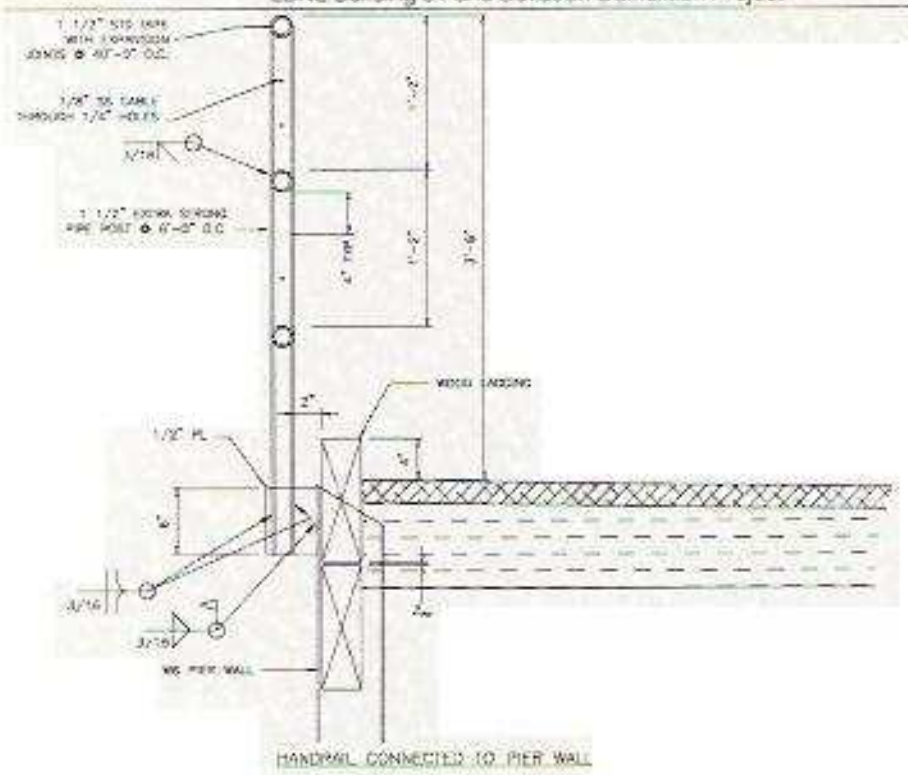


Figure 2

The retaining walls as defined in Section 4.8.1 and the retaining wall along gridline "17" from gridline "Z" to "X" present vehicle hazards and require pedestrian protection barriers to be installed Figure 3, with barrier rail attached to steel posts into 12-inch diameter concrete foundations spaced per California Department of Transportation requirements, provides the LBNL acceptable barrier arrangement.

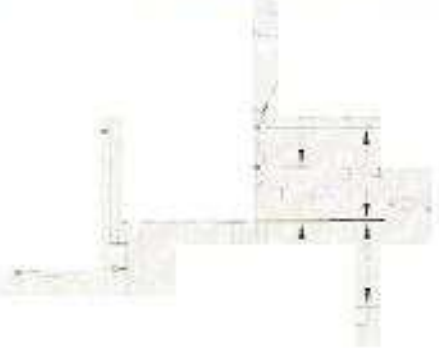
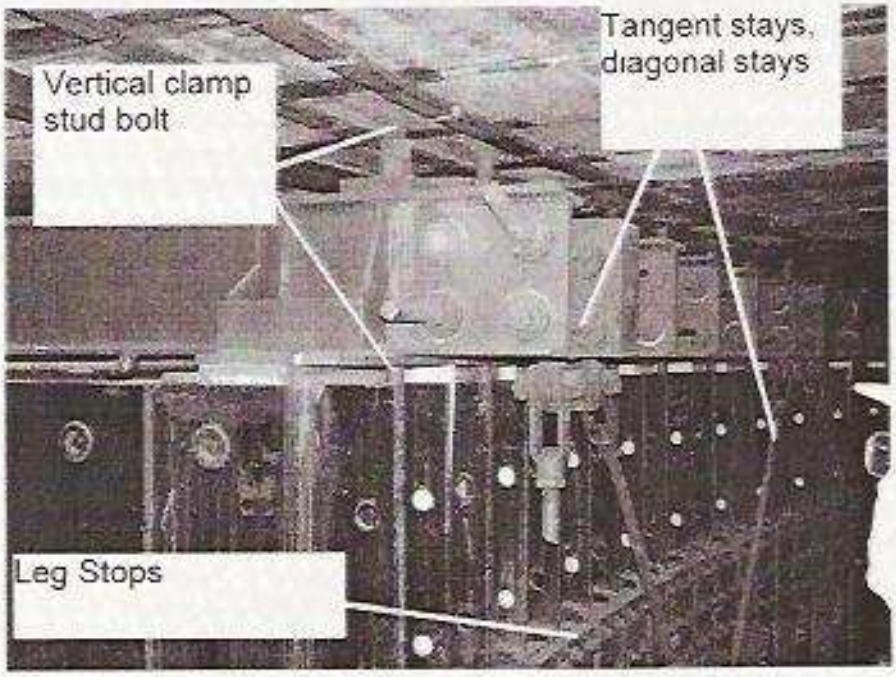


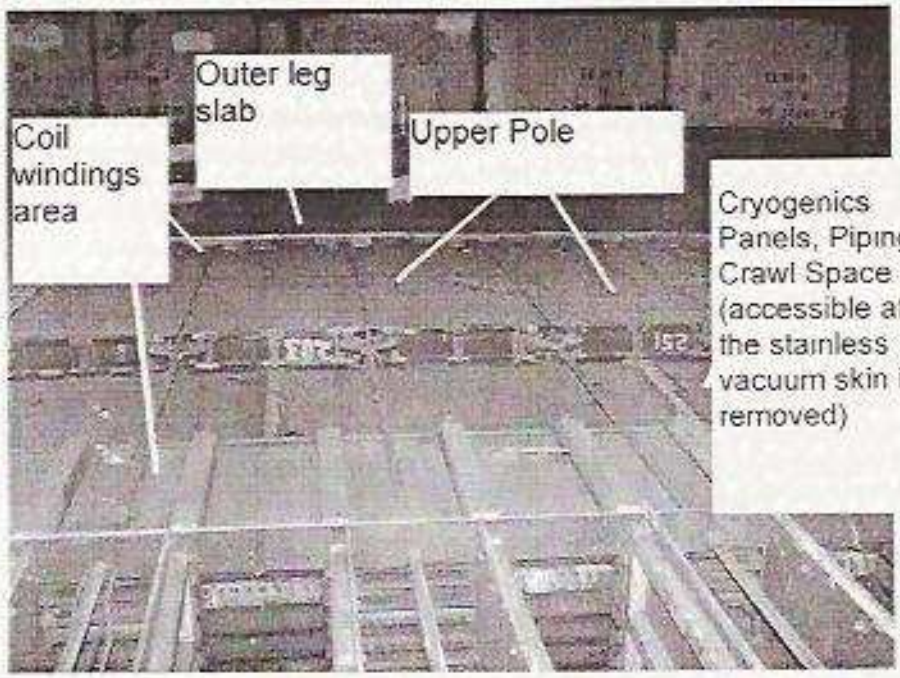
Figure 3

6 0 Appendixes

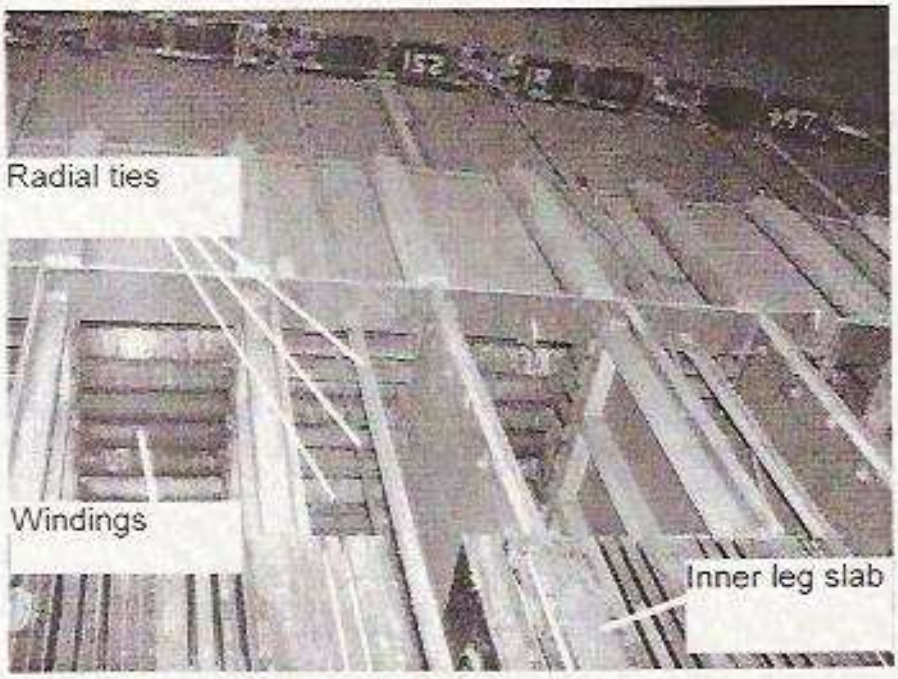
Appendix 1 Bevatron Pictures
Appendix 2, LBNL Drawing 3L1931B, Bevatron Magnet Terminology
Appendix 3, Drawing S-1 Final Site Configuration
Appendix 4 Drawing S-2, Foundation Structural Demolition Sequence
Appendix 5 Drawing S-3, Roof Demolition Sequence
Appendix 6, B51 Site Plan
Appendix 7 List of LBNL Drawings Used in Demolition Plan Development
Appendix 8, Project Fencing and Access
Appendix 9, Subsurface Drain Pipe Rerouting
Appendix 10, OSHA Demolition Engineering Survey
Appendix 11, Structural Engineer Stamped Calculations and/or Drawings



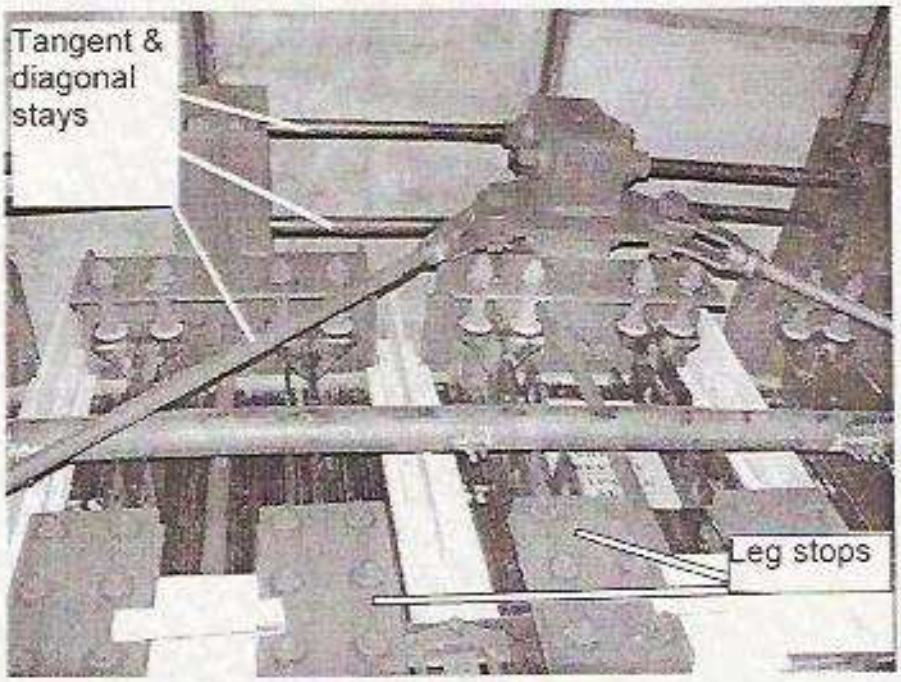
Picture 1
View Inside, Top Yoke Slab with Upper Clamp Beams



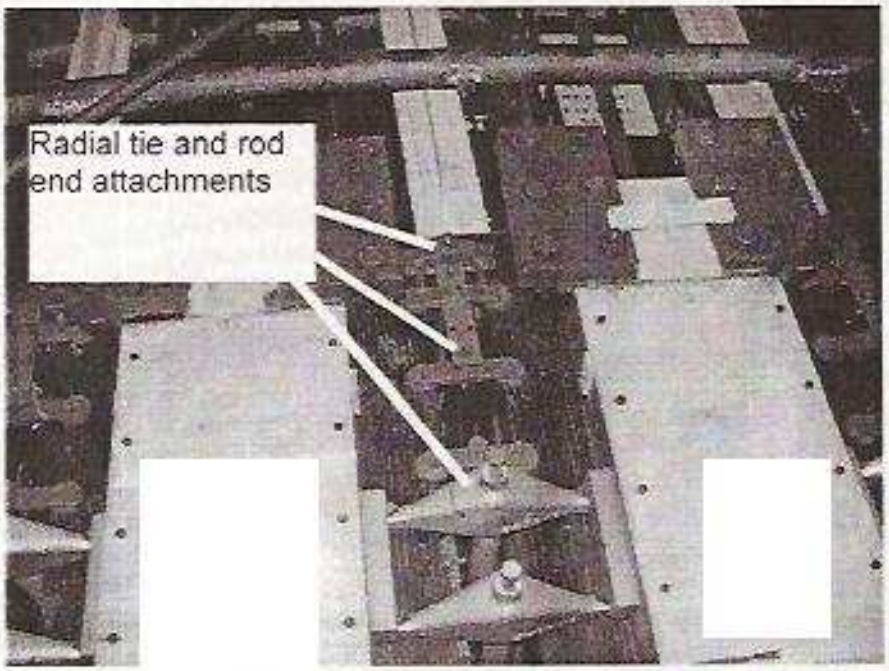
Picture 2
Top View Inside to Outside, Top Yoke Slab Removed



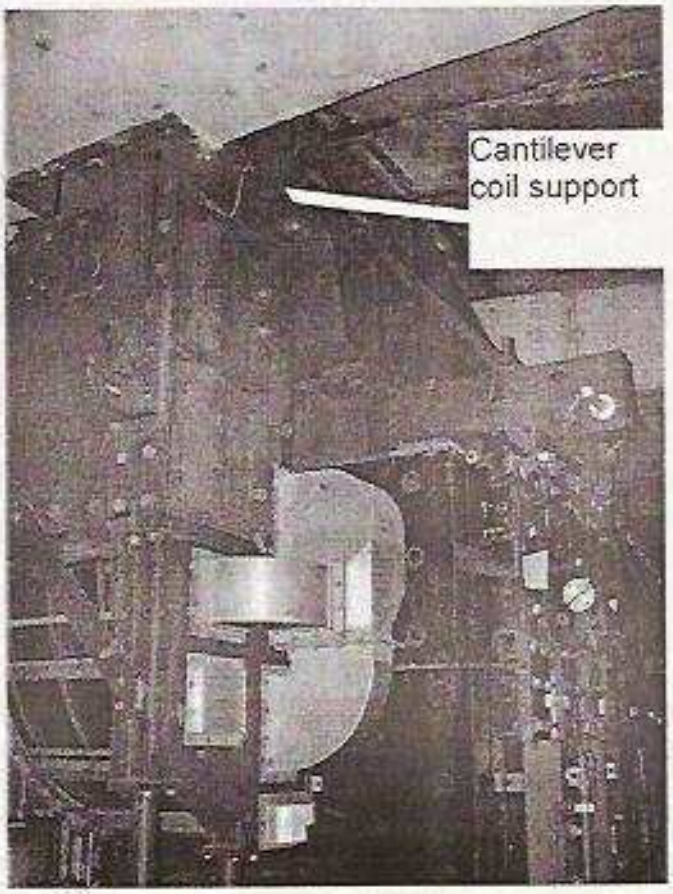
Picture 3
Top View Inside, Top Yoke Slab Removed



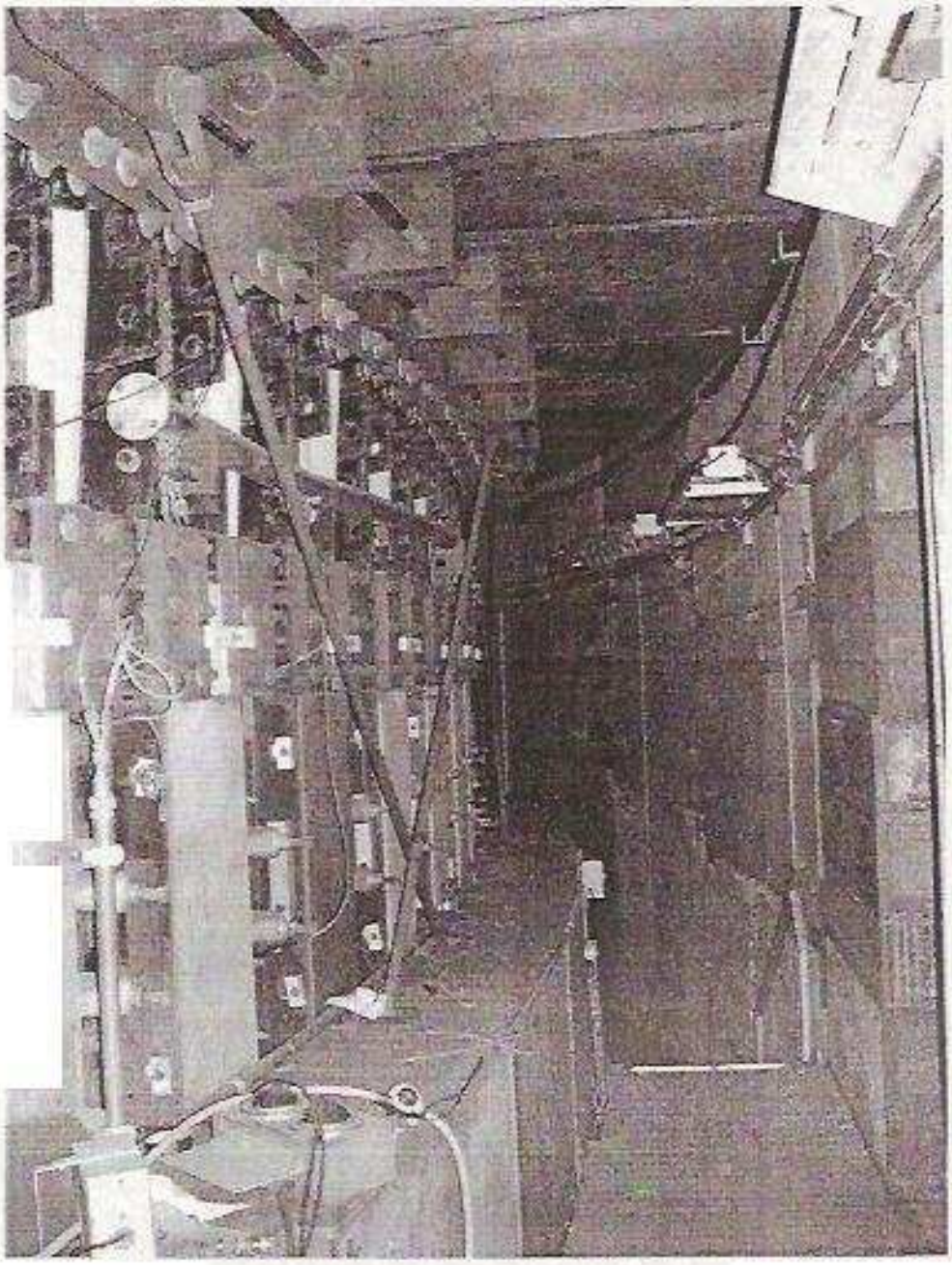
Picture 4
View Outside, Top Yoke Clamping



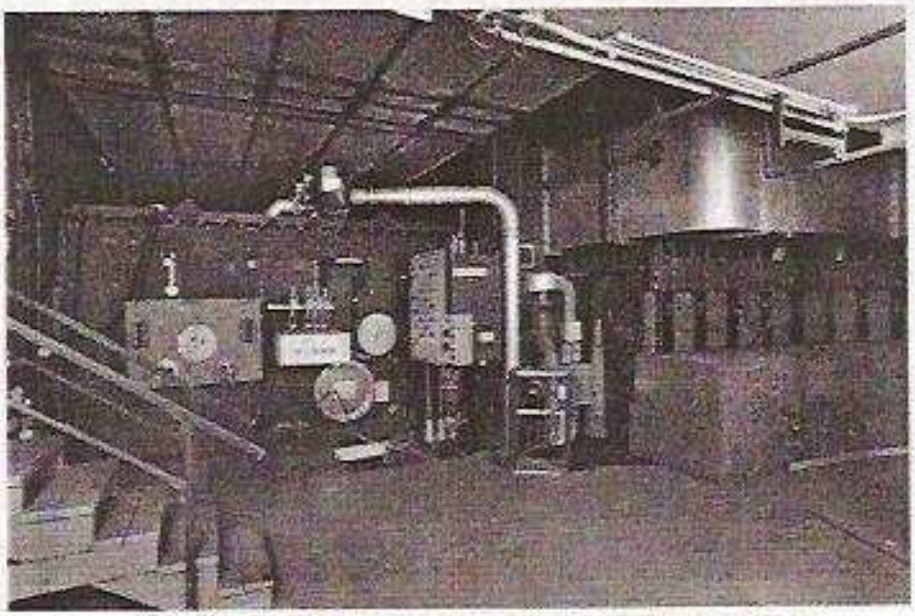
Picture 5
View Outside, Radial Tie and
Rod End Attachments



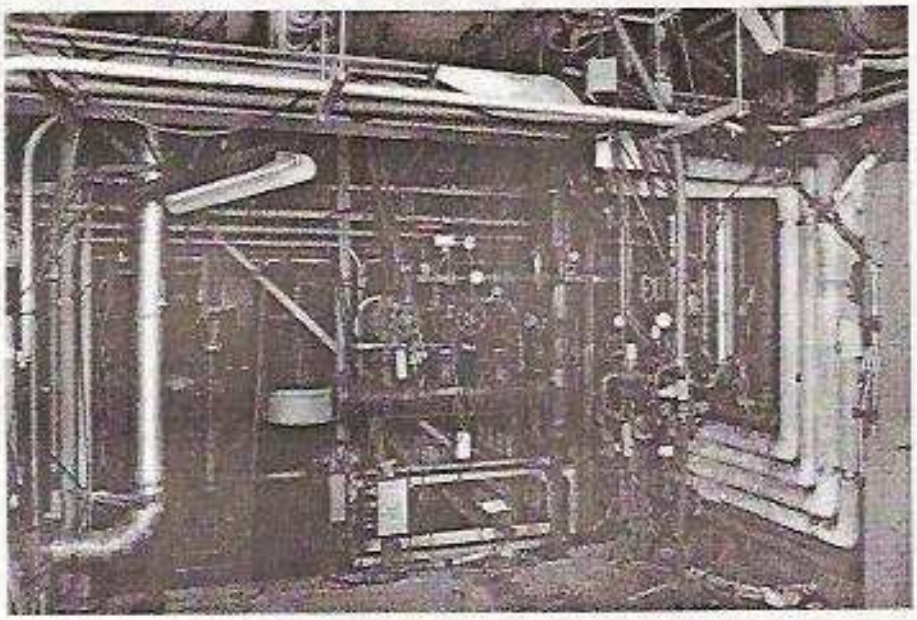
Picture 6
View Outside, Tangent Tank
Cantilever Coil Support



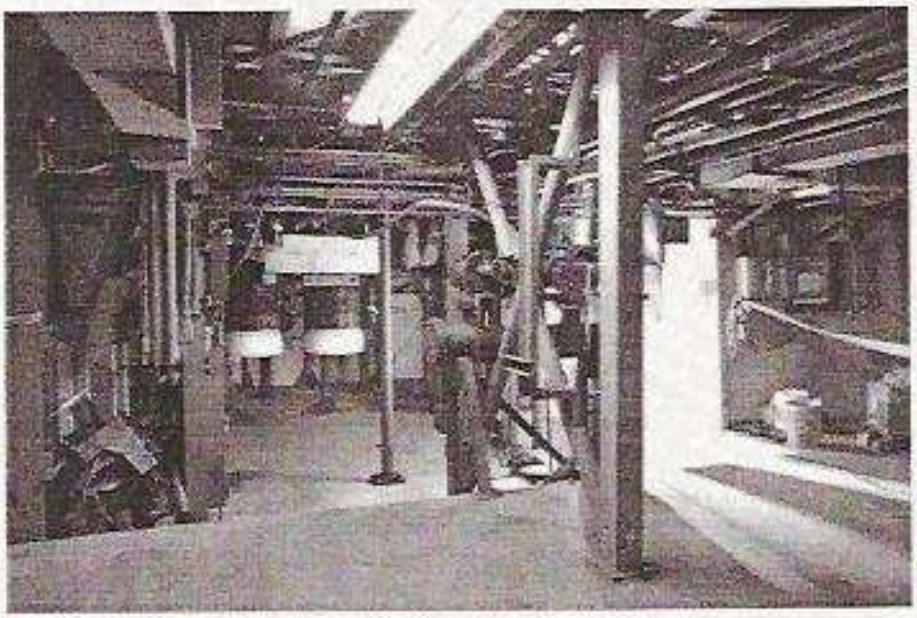
Picture 7
View Outside, General Arrangement



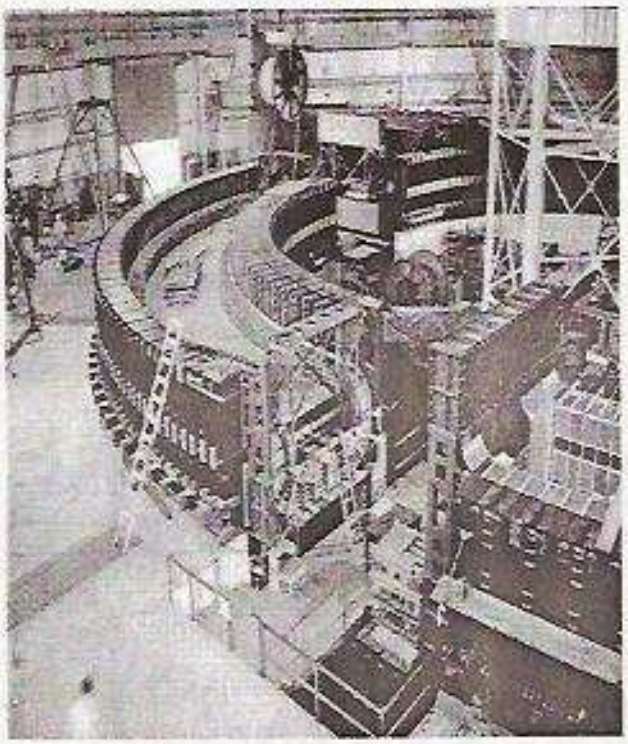
Picture 8
Inside View of Tangent Tank, General Arrangement



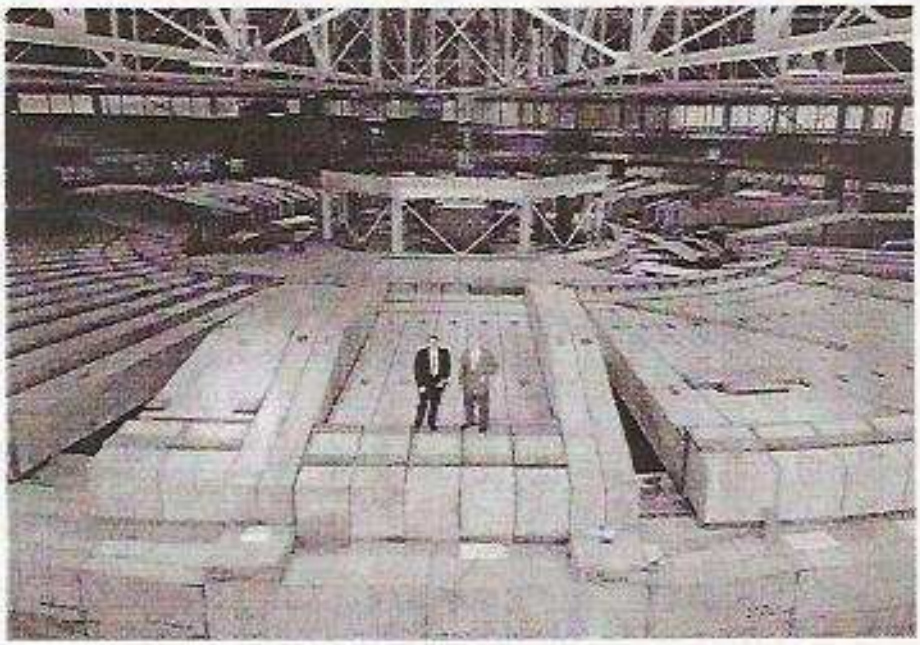
Picture 9
View Underneath Tangent Tank, Inside to Outside



Picture 10
View Underneath Tangent Tank, Inside to Outside

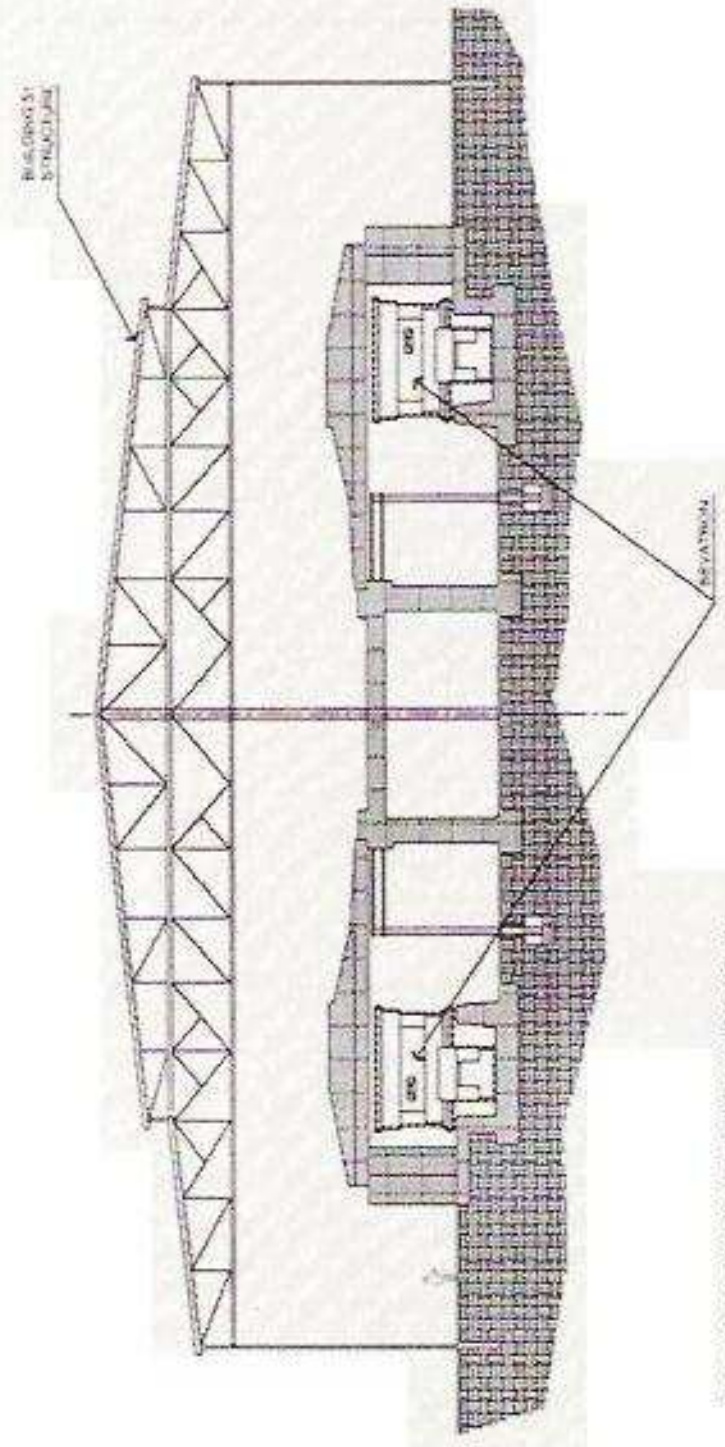


Picture 11
Original Bevatron Construction - Laying Cable

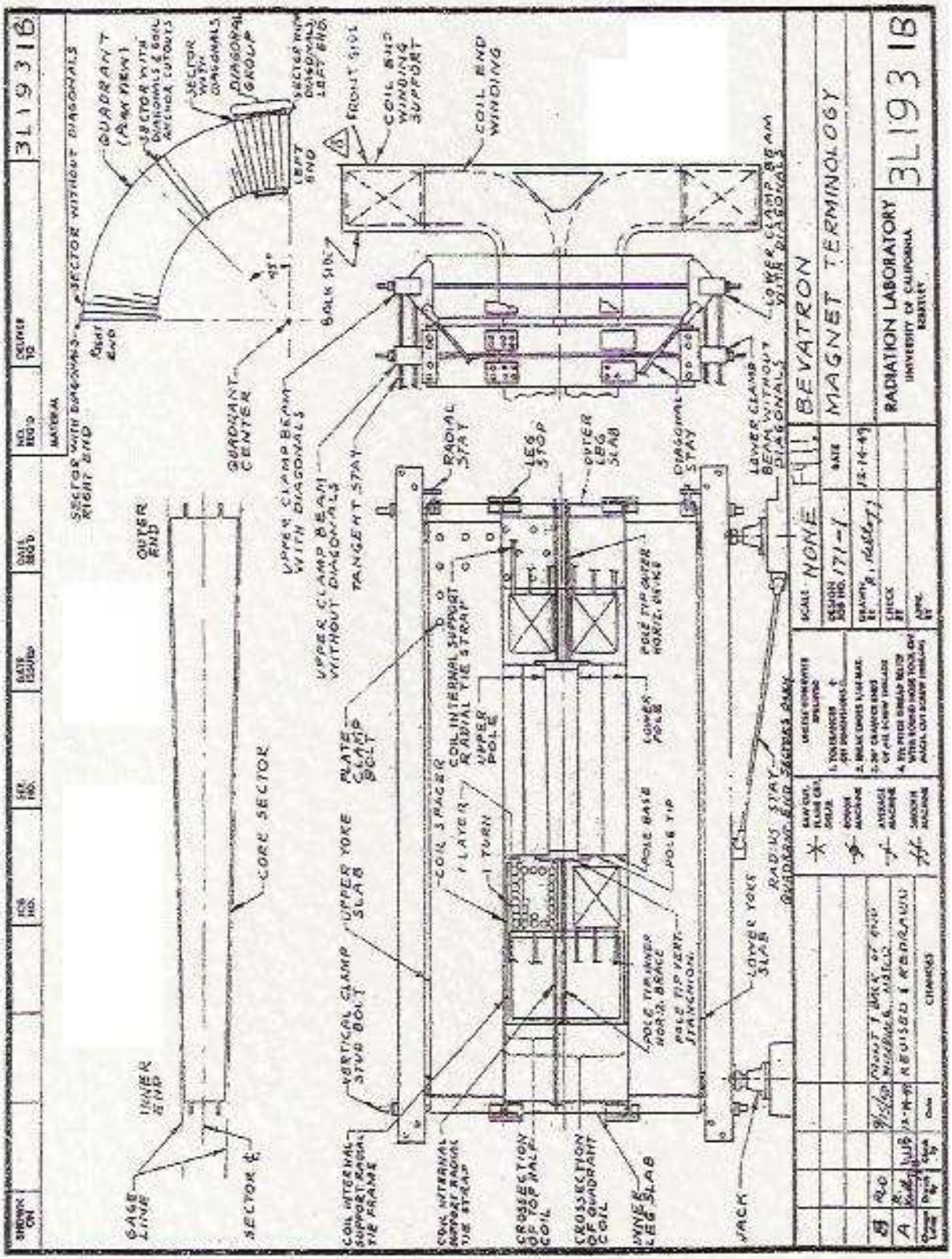


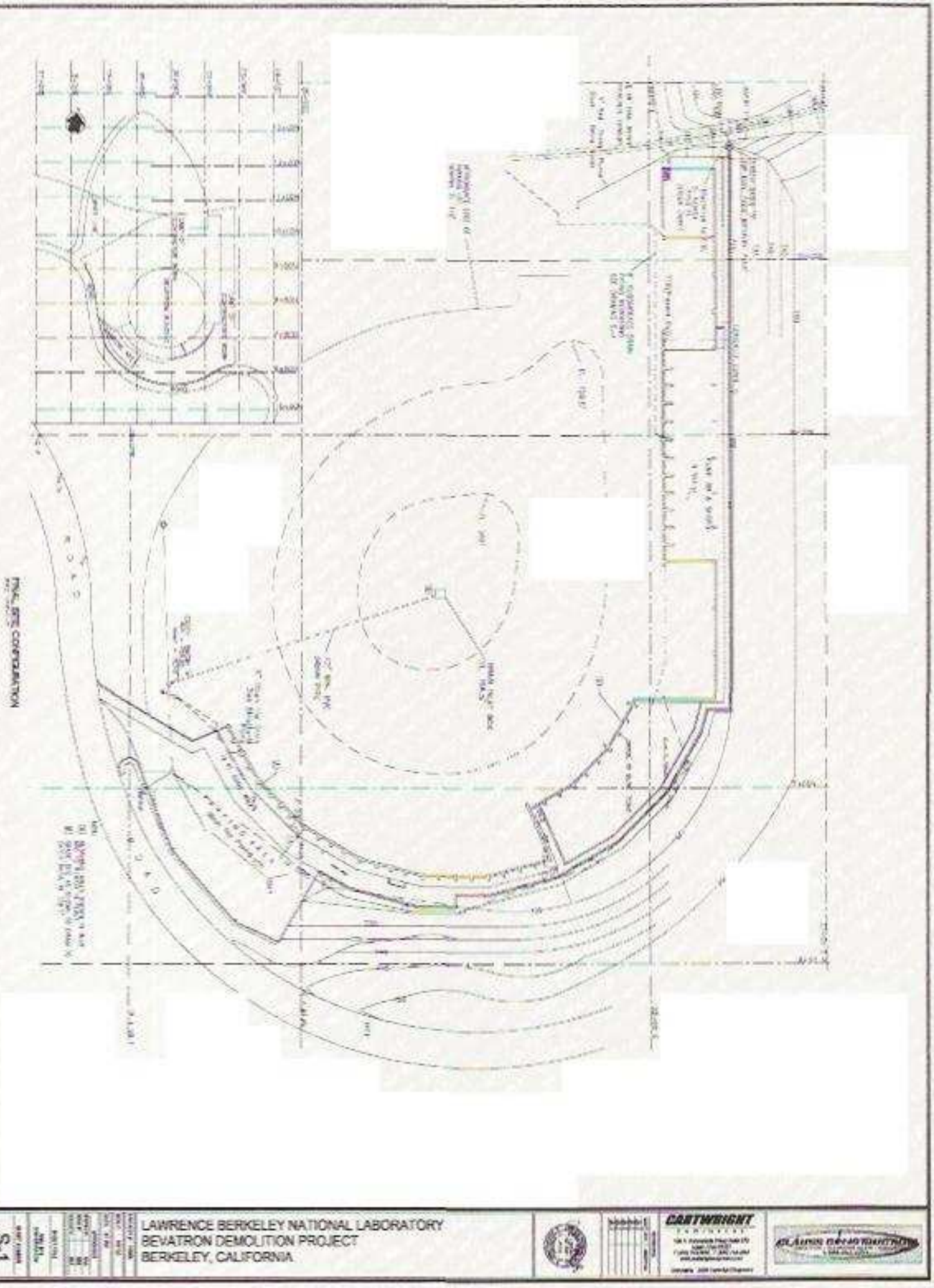
Picture 12
Roof Blocks

Picture 13
Building 51 Current Aerial View


BUILDING 51 STRUCTURE
BEVATRON
BEVATRON WITHIN BUILDING 51
SECTION DIAGRAM
0
25
50 FT

Appendix 2 - LBNL Drawing 3L1931B



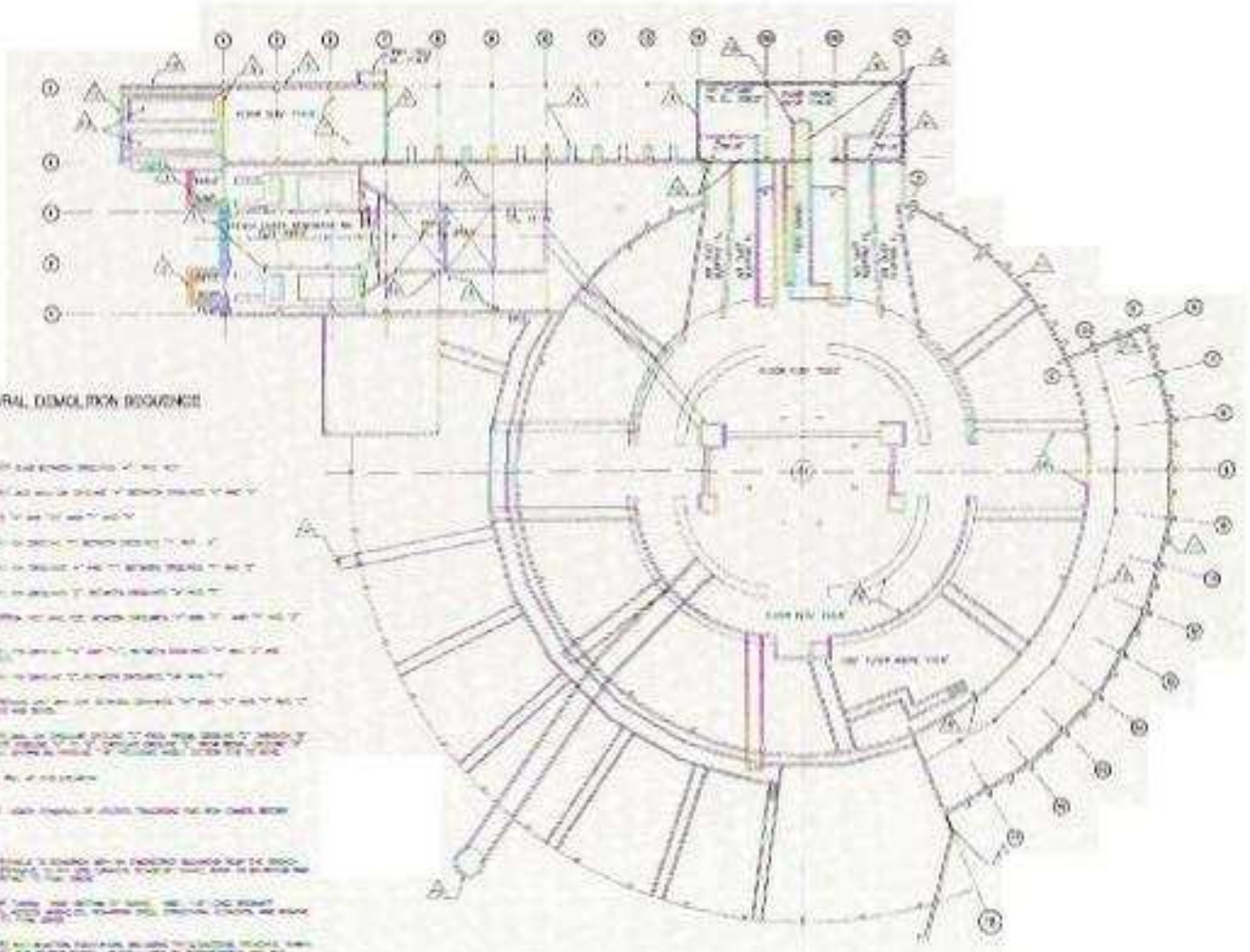


FINAL SITE CONFIGURATION

S-1

LAWRENCE BERKELEY NATIONAL LABORATORY
BEVATRON DEMOLITION PROJECT
BERKELEY, CALIFORNIA

CARTWRIGHT



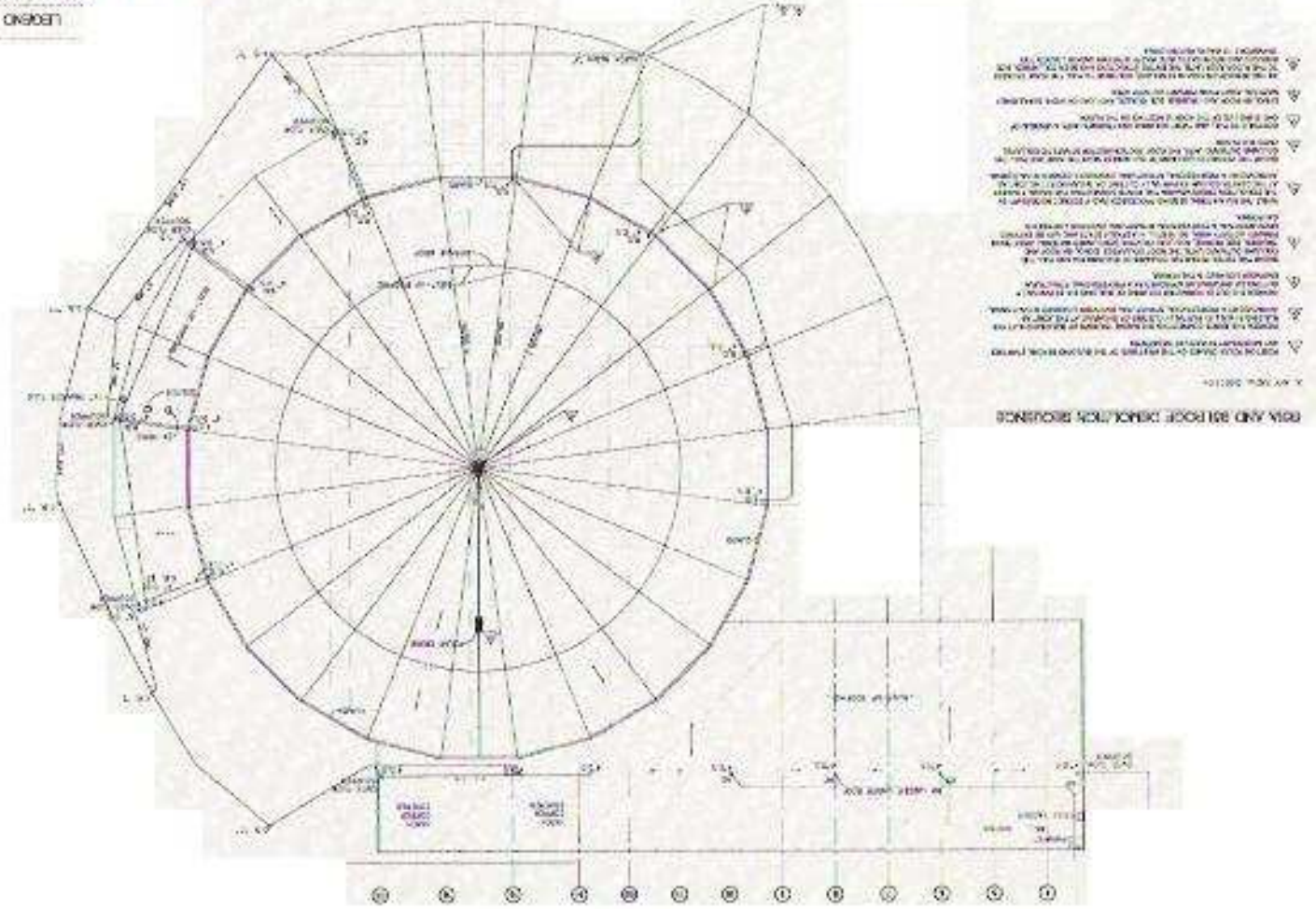
FOUNDATION STRUCTURAL DEMOLITION SEQUENCE

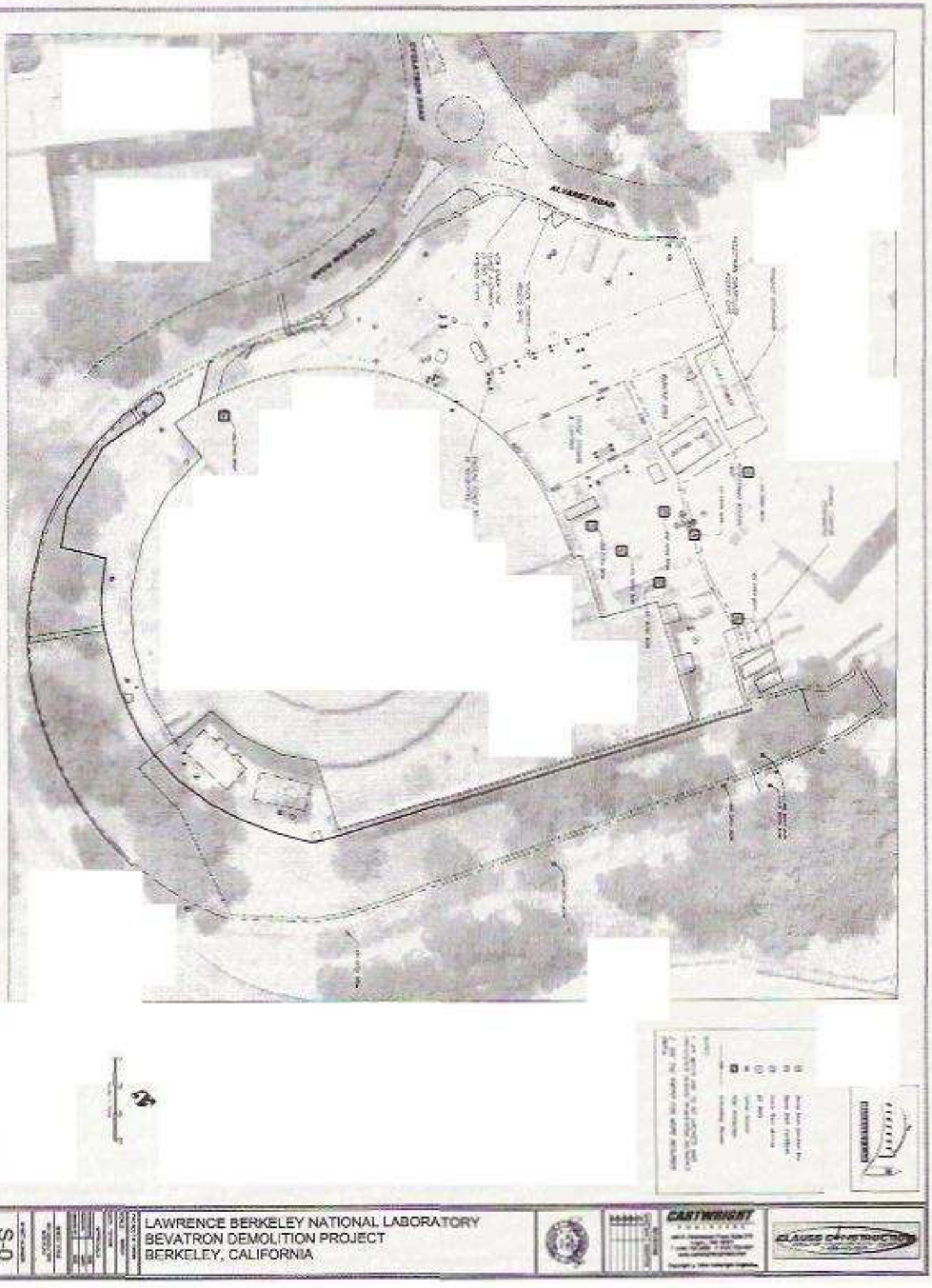
FOUNDATION STRUCTURAL DEMOLITION SEQUENCE

LAWRENCE BERKELEY NATIONAL LABORATORY
BEVATRON DEMOLITION PROJECT
BERKELEY, CALIFORNIA

S-2

LAWRENCE BERKELEY NATIONAL LABORATORY
BEVATRON DEMOLITION PROJECT
BERKELEY CALIFORNIA





LAWRENCE BERKELEY NATIONAL LABORATORY
BEVATRON DEMOLITION PROJECT
BERKELEY, CALIFORNIA

CASTWRIGHT

CLAUSS CONSTRUCTION

0-S

Appendix 7

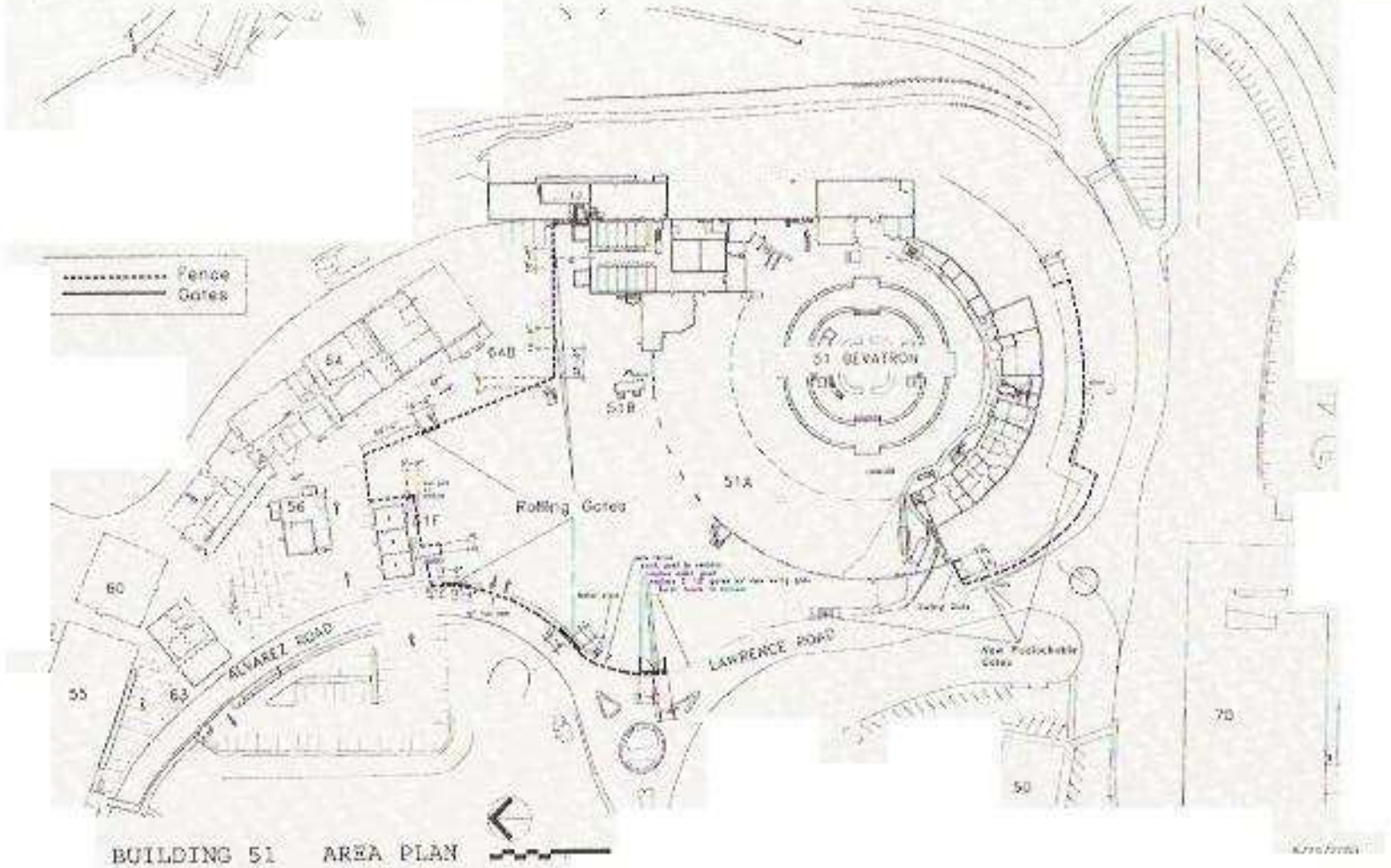
LBNL Drawings Used in Demolition Plan Development		
Number	**Title**	**Electronic File**
3L1624A	Arrangement of Two 30 Ton Cranes on Single Circular Track	03L1624A.pdf
3L1865	Magnet Core	03L1865.pdf
3L1931B	Magnet Terminology	03L1931B-1.pdf
3M3356B	Magnet Core Erection Drawing	03M3356B.pdf
3M4506K	Utilities Raceways & Trench Locations	03M4506K.pdf
3M5474	Magnet Core, Yoke & Leg Steel Relation Diagram	03M5474.pdf
3N6226	Magnet Core Erection, Magnet Layout	03N6226.pdf
3P3996A	Cooling Equipment Fan Room Motor Foundations	0P33996A.pdf
3P4006	Cooling Equipment, Fan Room, Fan & Motor Mounting	03P4006.pdf
3P8324	Cooling Equipment, Fan Room, Stairway to Catwalk Level	03P8324.pdf
3Q9235D	Bevatron Magnet Core, Pole Tip & Pole Base, Installation Assembly	03Q9235D.pdf
4B51C181	51 West Yard, Storm Drain Modifications	4B51C181.pdf
4B51C182	51 West Yard, Storm Drain Modifications	4B51C182.pdf
4N51M110	DRG: 207-A, 2-30 Ton Cap'y, 90 Ft Span, Radial Cranes	DRG207-A.pdf
4P1916E	Bevatron Vacuum System Envelope, Tangent Tank, West Inside Rad Doghouse	04P1916E.pdf
4P1944C	Bev. Misc. General, Tangent Area Plaforms	04P1944C.pdf
4P1953A	West Tangent Area Platforms, Stairs, & Rails	04P1953A.pdf
4P1963	South Tangent Area Platforms, Stairs, & Rail	04P1963.pdf
4P1973	West Tangent Area Platforms	04P1973.pdf
4P4453B	East Tangent Area Platforms, Stairs, & Rails	04P4453B.pdf
4P4545B	West Tangent Area, End Section Elevation	04P4545B.pdf
5N51A001	Plot Plan	20060131-122207.pdf
5N51A002	Sub Floor Plan	20060131-122701.pdf
5N51A003	Roof Plan	20060131-123245.pdf
5N51A004	Floor Plans (East Half)	20060131-123821.pdf
5N51A005	Floor Plans (West Half)	20060131-124303.pdf
5N51A006	South & West Elevations	20060131-124842.pdf
5N51A007	North & East Elevations	20060131-125355.pdf
5N51A008	Transverse Section	20060131-125854.pdf
5N51A009	Detail Sections	20060131-130359.pdf
5N51A010	Exterior Wall Details	20060131-130923.pdf
5N51A012	Stairways	20060131-132436.pdf
5N51A013	Interior Details	20060131-132930.pdf
5N51F078	Foundation Plan	TDS4501198.pdf
5N51F079	Longitudinal Section	TDS4501199.pdf
5N51F080	Shaft & Approach Tunnel Details	TDS4501200.pdf
5N51F081	Details of Access Tunnel	TDS4501201.pdf
5N51F082	Details of Foundation Tunnel	TDS4501202.pdf
5N51F083	Details of Foundation Tunnel Northeast Quadrant	TDS4501203.pdf
5N51F084	Details of Foundation Tunnel at Existing Platform Footings	TDS4501204.pdf
5N51M097	Mechanical Work	5N51M09700001J.pdf
5N51M031	Sub Floor Drainage	5N51M03100001J.pdf
5N51R055	Composite Drainage Plans	5N51R05500001J.pdf
5N51S014	Foundation Plan - East Half	20060131-111922.pdf
5N51S015	Foundation Plan - West Half	20060131-112356.pdf
5N51S016	Floor Framing Plans	20060131-112829.pdf
5N51S017	Crane Girder & Framing Details	20060131-113336.pdf
5N51S018	Roof Framing Plan & Details	20060131_113818.pdf
5N51S019	Foundation & Retaining Wall Details	20060131-114239.pdf
5N51S020	Typical Concrete Details	20060131-114730.pdf
5N51S021	Concrete Columns & Trench Details	20060131-115143.pdf
5N51S022	Motor Generator Support and Misc. Wall Details	20060131-115620.pdf
5N51S023	Main Bldg. - Wall and Column Details	20060131-120025.pdf
5N51S024	Roof Trusses & Structural Det's	20060131-120441.pdf
5N51S025	Steel Framing Details	20060131-120908.pdf

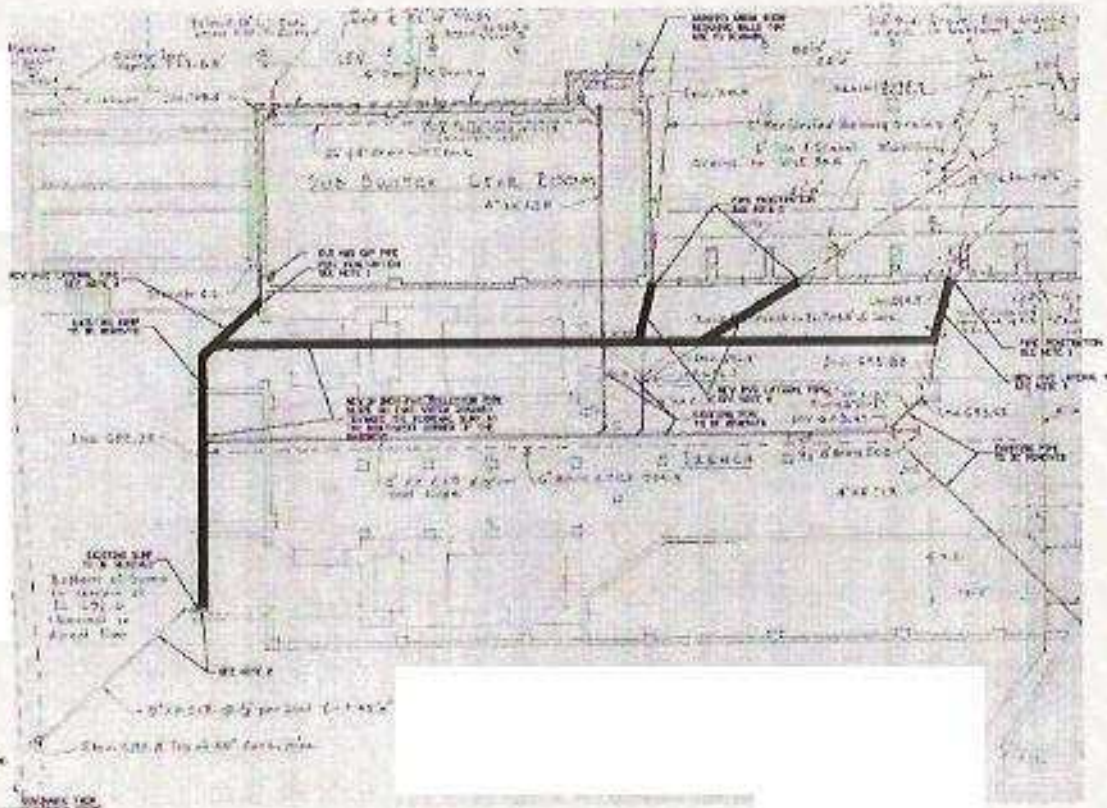
Appendix 7

LBNL Drawings Used in Demolition Plan Development		
Number	**Title**	**Electronic File**
5N51S026	Magnet Foundation Plan & Details	20060131-121316.pdf
5N51S027	Magnet Foundation Pits and Details	20060131-121717.pdf
5N51S085	Foundation and Floor Plan	20060131-102720.pdf
5N51S086	General Plan	20060131-103218.pdf
5N51S087	General Sections	20060131-103609.pdf
5N51S088	Shielding Wall Support Slab Details	20060131-103954.pdf
5N51S089	Shielding Wall Support Misc. Details	20060131-104403.pdf
5N51S090	Miscellaneous Concrete Details	20060131-104813.pdf
5N51S091	West Man Access Details	20060131-105309.pdf
5N51S092	Heavy - Duty Floor Details	20060131-105714.pdf
5N51S093	Center Structure Roof Plan and Details	20060131-110325.pdf
5N51S094	Shielding Support Structure Steel Framing & Details	20060131-110731.pdf
5N51S095	Structural Steel Details	20060131-111151.pdf
5N51S096	Miscellaneous Details	20060131-111549.pdf
8L1116	Bevatron Shielding, Study No 4, 20' & 25' Wall	Shield_Blocks.pdf
8L1126	Bevatron Shielding, Roof From Existing Wall to Magnet, Study No 5	Shield_Blocks.pdf
9L5463	Shielding Wall, Exit Type A, Study No 1	Shield_Blocks.pdf
9L8346G	Plan, Roof Block Ass'y	09L8346G.pdf 20060301-151216.pdf 20060301-151712.pdf Shield_Blocks.pdf
9L8366B	Bevatron Shielding, Proposed Access Tunnel Area	Shield_Blocks.pdf
9N5666A	Bevatron Shielding Outer Ring Roof, Block No QR-1	Shield_Blocks.pdf
9N5686B	Bevatron Shielding Outer Ring Roof, Block No QR-3	Shield_Blocks.pdf
9N5686B	Roof Block QR-3	09N5686B.pdf
9N5706A	Bevatron Shielding Outer Ring Roof, Block No QR-5	Shield_Blocks.pdf
9N5716B	Bevatron Shielding Outer Ring Roof, Block No QR-6	Shield_Blocks.pdf
9N5726A	Bevatron Shielding Outer Ring Roof, Block No TR-1	Shield_Blocks.pdf
9N5736A	Bevatron Shielding Outer Ring Roof, Block No TR-2	Shield_Blocks.pdf
9N5746B	Bevatron Shielding Outer Ring Roof, Block No TR-3	Shield_Blocks.pdf
9N5756B	Bevatron Shielding Outer Ring Roof, Block No TR-4	Shield_Blocks.pdf
9N5766B	Bevatron Shielding Outer Ring Roof, Block No TR-5	Shield_Blocks.pdf
9N6266A	Outer Ring Roof Blocks - Sections	09N6266A.pdf
9P6506B	Wall Block Ass'y, Developed View	09P6506B.pdf 20060301-150619.pdf 20060301-151528.pdf
9Q2984	Experimental Area Wall - Devel'd View	09Q2984.pdf 20060301-150917.pdf Shield_Blocks.pdf
13L2304B	Inner Ring Roof, Tangent Area Block TIR-1	13L2304B.pdf Shield_Blocks.pdf
13L2314B	Inner Ring Roof, Tangent Area Block TIR-2	13L2314B.pdf Shield_Blocks.pdf
13L2324A	Inner Ring Roof, Tangent Area Block QIR-1	13L2324A.pdf Shield_Blocks.pdf
13L2334A	Inner Ring Roof, Tangent Area Block QIR-2	Shield_Blocks.pdf
13L2344A	Inner Ring Roof, Tangent Area Block QIR-3	13L2344B.pdf Shield_Blocks.pdf
13M8353	Bevatron Shielding, Weight, Density, & Test Report Sheet	Shield_Blocks.pdf
13M8363	Bevatron Shielding, Weight, Density, & Test Report Sheet	Shield_Blocks.pdf
13M8373	Bevatron Shielding, Weight, Density, & Test Report Sheet	Shield_Blocks.pdf
14M1126A	Bevatron Shielding Outer Ring Roof, Block No QR-7	Shield_Blocks.pdf
14M1136A	Bevatron Shielding Outer Ring Roof, Block No QR-8	Shield_Blocks.pdf
14M1146A	Bevatron Shielding Outer Ring Roof, Block No TR-6	Shield_Blocks.pdf
14M1156A	Bevatron Shielding Outer Ring Roof, Block No TR-7	Shield_Blocks.pdf

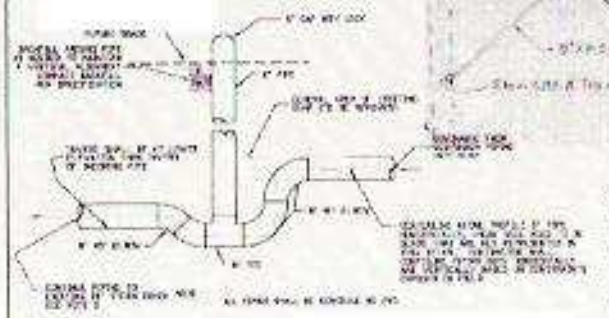
Appendix 7

LBNL Drawings Used in Demolition Plan Development		
Number	**Title**	**Electronic File**
14M1166A	Bevatron Shielding Outer Ring Roof, Block No TR-8	Shield_Blocks.pdf
14Q2845	Miscellaneous Block Details	Shield_Blocks.pdf
14Q2855	Miscellaneous Block Details	Shield_Blocks.pdf
14Q2865	Miscellaneous Block Details	Shield_Blocks.pdf
B59S0101	Floor and Foundation Plan - 51	20060322-141529.pdf
B59S0102	Roof Framing Plan, Crane Girder Plan - 51	20060322-141829.pdf
B59S0103	Structural Steel Details, Trusses - 51	20060322-142647.pdf
B59S0104	Structural Steel Details, Wall Elevations & Bracing -51	20060322-143218.pdf
B59S0105	Structural Steel Details, Misc - 51	20060322-143820.pdf
B59S101	Floor & Foundation Plan	20060322-141529.pdf
B59S102	Roof Framing Plan – Crane Girder Plan	20060322-141829.pdf
B59S103	Structural Steel Details	20060322-142647.pdf
B59S104	Structural Steel Details Wall Elevation & Bracing	20060322-143218.pdf
B59S105	Structural Steel Details Misc	20060322-143820.pdf
DRG. 207-1	30 Ton Cap'y, 90 Ft Span, Radial Cranes - Outboard Truck General Drawing	DRG207-1.pdf
DRG. 207-2	30 Ton Cap'y, 90 Ft Span, Radial Cranes - Inboard Truck General Drawing	DRG207-2.pdf
DRG. 207-4	30 Ton Cap'y, 90 Ft Span, Radial Cranes - Pivot Arms Detail	DRG207-4.pdf
DRG. 207-7	30 Ton Cap'y, 90 Ft Span, Radial Crane - Girder Detail	DRG207-7.pdf
Table A-1-7	Green Deconstruction Plan, Concrete Shielding Inventory - Bevatron Pillbox Roof	Table_A-1-7.pdf

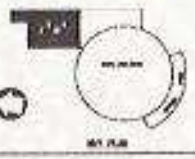

Fence
Gates
51 BEVATRON
51A
51B
64
64B
56
1F
Rolling Gates
60
55
63
ALVAREZ ROAD
LAWRENCE ROAD
New Pedestrian Gates
70
50
BUILDING 51 AREA PLAN



SUBSURFACE DRAIN PIPE REROUTING PLAN



DETAIL 1



UNIVERSITY OF CALIFORNIA
DEVATRON BUILDING
SUBSURFACE DRAIN
PIPE REROUTING

S-4

PRELIMINARY

CARTWRIGHT
ENGINEERS

12 December 2008

William Musbach, Sr. VP
Clauss Construction Co.
8956 Winter Gardens Blvd.
Lakeside, CA 92040

RE BEVATRON & BLDG. 51-51A
LAWRENCE BERKELEY NATIONAL LAB

William

As per your request, I have conducted an OSHA Engineering Survey, prior to demolition, for the above referenced project. The purpose of this survey is to determine the condition of the framing, floors, and walls so that measures can be taken, if necessary, to prevent the premature collapse of any portion of the structure. To that end, please accept this letter as the report of that survey.

Building 51 and addition 51A are constructed of a steel moment-resisting space frame with solid wood diaphragm sheathing. Suspended floors, below-grade walls and foundations are constructed of cast-in-place concrete. The structure appears to be in original condition with no signs of excessive movement, distress, or damage.

The environmental effects of the operating Bevatron requires massive concrete shielding. The Bevatron is surrounded, above grade, with stacked wall blocks and radial roof blocks. The blocks weigh as much as 60,000 lbs. each and are made stable by the effects of gravity and keyways. It appears the concrete shielding structure has been modified over time to permit equipment modifications. As a result of the shield block modifications, no loss of strength or stability is apparent.

The Bevatron machine is a continuously supported, steel-framed, circular, hollow, electro-magnet. Its purpose of design is such that it is contain sufficient steel mass to develop magnetic attraction and extremely rigid to maintain critical alignment. Due to its massive weight, highly redundant structural system, and void of any external environmental demand, the machine has no signs of movement, distress, or damage.

The Bevatron and buildings 51 and 51A can be demolished using conventional means and methods in a sequence as described in the contractors Demolition Plan. Prior to any demolition activity, each critical phase should be planned with the structural engineer to achieve the desired results. Weakening of key structural elements and erecting temporary falsework may be required

Craig A. Cartwright
Calif. SE 3657