Form Approved. OMB No. 2040-0042. Approval Expires 6-30-

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, DC 20460

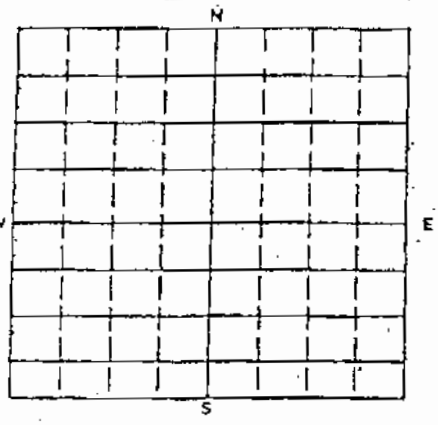
EPA

PLUGGING AND ABANDONMENT PLAN

NAME AND ADDRESS OF FACILITY
Puna Geothermal Venture
14-3860 Kapoho-Pahoa Road
Pahoa, HI 96778

NAME AND ADDRESS OF OWNER/OPERATOR
Puna Geothermal Venture
P. O. Box 30
Pahoa, HI 96778

LOCATE WELL AND OUTLINE UNIT ON SECTION PLAT — 640 ACRES N/A



STATE	COUNTY	PERMIT NUMBER
HI	Hawaii	

SURFACE LOCATION DESCRIPTION
___ 1/4 of ___ 1/4 of ___ 1/4 of N/A 1/4 of Section___ Township___ Range___

LOCATE WELL IN TWO DIRECTIONS FROM NEAREST LINES OF QUARTER SECTION AND DRILLING UNIT
Surface Location 8902.9 ft N. and 9919.0 ft E of Kaliu Benchmark
Location ___ ft. from (N/S) ___ Line of quarter section
and ___ ft. from (E/W) ___ Line of quarter section

TYPE OF AUTHORIZATION
- ☐ Individual Permit
- ☒ Area Permit
- ☐ Rule

Number of Wells ___

WELL ACTIVITY
- ☐ CLASS I
- ☐ CLASS II
  - ☐ Brine Disposal
  - ☐ Enhanced Recovery
  - ☐ Hydrocarbon Storage
- ☐ CLASS III
- x Class V

Lease Name Kapoho State
Well Number 1A

CASING AND TUBING RECORD AFTER PLUGGING

SIZE	WT(LB/FT)	TO BE PULLED IN WELL (FT)	TO BE LEFT IN WELL (FT)	HOLE SIZE
20"	94		0-1376	26"
13/8"	61		0-2200	17 1/2"
5/8	47		0-4061	12 1/4"
7"	26&29	3895-6505	0-3510	8 1/2"

METHOD OF EMPLACEMENT OF CEMENT PLUGS
- ☒ The Balance Method
- ☐ The Dump Bailer Method
- ☐ The Two-Plug Method
- ☐ Other

CEMENTING TO PLUG AND ABANDON DATA:	PLUG #1	PLUG #2	PLUG #3	PLUG #4	PLUG #5	PLUG #6	PLUG #7
Size of Hole or Pipe in which Plug Will Be Placed (inches)	8 1/2	8.7-6.2	6.184	6.184	6.184	6.184	
Depth to Bottom of Tubing or Drill Pipe (ft.)	4800*	3610	3010	2300	1550	170	
Sacks of Cement To Be Used (each plug)	293	42	52	28	39	24	
Slurry Volume To Be Pumped (cu. ft.)	475	68	85	46	63	39	
Calculated Top of Plug (ft.)	3795	3410	2640	2100	1276	0	
Measured Top of Plug (if tagged ft.)							
Slurry Wt. (Lb./Gal.)	15.5	15.5	15.5	15.5	15.5	15.5	
Type Cement or Other Material (Class III)	Hawaiian +40% silica flour						

LIST ALL OPEN HOLE AND/OR PERFORATED INTERVALS AND INTERVALS WHERE CASING WILL BE VARIED (If any)

From	To	From	To
4061	6505		

Estimated Cost to Plug Wells
$105,000 - $150,000

CERTIFICATION

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)

NAME AND OFFICIAL TITLE (Please type or print)	SIGNATURE	DATE SIGNED
MICHAEL S. KALEIKINI PLANT MANAGER	Michael S. Kaleikini	4/14/92

EPA Form 7520-14

* Depth of first plug may be revised if wellbore is constructed.

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EPA

PLUGGING AND ABANDONMENT PLAN

NAME AND ADDRESS OF FACILITY
Puna Geothermal Venture
14-3860 Kapoho-Pahoa Road
Pahoa, HI 96778

NAME AND ADDRESS OF OWNER/OPERATOR
Puna Geothermal Venture
P.O Box 30
Pahoa, HI 96778

LOCATE WELL AND OUTLINE UNIT ON SECTION PLAT — 640 ACRES N/A

N / W / E / S

STATE: HI
COUNTY: Hawaii
PERMIT NUMBER:

SURFACE LOCATION DESCRIPTION N/A
___ 1/4 of ___ 1/4 of ___ 1/4 of ___ 1/4 of Section ___ Township ___ Range ___

LOCATE WELL IN TWO DIRECTIONS FROM NEAREST LINES OF QUARTER SECTION AND DRILLING UNIT
Surface Location 8317.9 ft N and 9430.2 ft E of Kaliu Benchmark
___ ft. from (N/S) ___ Line of quarter section
and ___ ft. from (E/W) ___ Line of quarter section

TYPE OF AUTHORIZATION
- ☐ Individual Permit
- ☒ Area Permit
- ☐ Rule

Number of Wells ___

Lease Name Kapoho State

WELL ACTIVITY
- ☐ CLASS I
- ☐ CLASS II
  - ☐ Brine Disposal
  - ☐ Enhanced Recovery
  - ☐ Hydrocarbon Storage
- ☐ CLASS III
- X Class V

Well Number 3

CASING AND TUBING RECORD AFTER PLUGGING

SIZE	WT(LB/FT)	TO BE PUT IN WELL (FT)	TO BE LEFT IN WELL (FT)	HOLE SIZE
20"	94		0-1030	26"
13 3/8"	61		0-2209	17 1/2"
9 5/8"	47		0-3897	12 1/4"
7"	29	3767-6835	0-3724	8 1/2"

METHOD OF EMPLACEMENT OF CEMENT PLUGS
- ☒ The Balance Method
- ☐ The Dump Bailer Method
- ☐ The Two-Plug Method
- ☐ Other

CEMENTING TO PLUG AND ABANDON DATA:	PLUG #1	PLUG #2	PLUG #3	PLUG #4	PLUG #5	PLUG #6	PLUG #7
Size of Hole or Pipe in which Plug Will Be Placed (inches)	8 1/2	6.184	6.184	6.184	6.184		
Depth to Bottom of Tubing or Drill Pipe (ft.)	5198*	2660	2309	1130	170		
Sacks of Cement To Be Used (each plug)	460	40	65	28	24		
Slurry Volume To Be Pumped (cu. ft.)	744	64	105	46	39		
Calculated Top of Plug (ft.)	3624	2380	1850	930	0		
Measured Top of Plug (if tagged ft.)							
Slurry Wt. (Lb./Gal.)	15.5	15.5	15.5	15.5	15.5		
Type Cement or Other Material (Class III)	Hawaiian + 40% silica flour						

LIST ALL OPEN HOLE AND/OR PERFORATED INTERVALS AND INTERVALS WHERE CASING WILL BE VARIED (if any)

From	To	From	To
3897	6835		

Estimated Cost to Plug Wells

$110,000 - $155,000 **

CERTIFICATION

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)

NAME AND OFFICIAL TITLE (Please type or print)	SIGNATURE	DATE SIGNED
MICHAEL KALEIKINI PLANT MGR	Michael Kaleikini	4-MAR-93

* Depth of first plug may be revised if wellbore is obstructed

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WASHINGTON, DC 20460

EPA PLUGGING AND ABANDONMENT PLAN

NAME AND ADDRESS OF FACILITY
Puna Geothermal Venture
14-3860 Kapoho-Pahoa Road
Pahoa, HI 96778

NAME AND ADDRESS OF OWNER/OPERATOR
Puna Geothermal Venture
P.O. Box 30
Pahoa, HI 96778

LOCATE WELL AND OUTLINE UNIT ON SECTION PLAT — 640 ACRES N/A

N / W / E / S

STATE: HI
COUNTY: Hawaii
PERMIT NUMBER:

SURFACE LOCATION DESCRIPTION N/A
___ 1/4 of ___ 1/4 of ___ 1/4 of ___ 1/4 of Section ___ Township ___ Range ___

LOCATE WELL IN TWO DIRECTIONS FROM NEAREST LINES OF QUARTER SECTION AND DRILLING UNIT
8289.0 ft N and 9360.9 ft E of Kaliu Benchmark
Surface Location ___ ft. from (N/S) ___ Line of quarter section
and ___ ft. from (E/W) ___ Line of quarter section

TYPE OF AUTHORIZATION
- ☐ Individual Permit
- ☒ Area Permit
- ☐ Rule

Number of Wells ___

Lease Name: Kapoho State

WELL ACTIVITY
- ☐ CLASS I
- ☐ CLASS II
  - ☐ Brine Disposal
  - ☐ Enhanced Recovery
  - ☐ Hydrocarbon Storage
- ☐ CLASS III
- X Class V

Well Number: 4

CASING AND TUBING RECORD AFTER PLUGGING

SIZE	WT(LB/FT)	TO BE PUT IN WELL (FT)	TO BE LEFT IN WELL (FT)	HOLE SIZE
20"	94		0-1054	26"
13 3/8"	61		0-2043	17 1/2"
9 5/8"	47		0-3930	12 1/4"
7"	29			8 1/2"

METHOD OF EMPLACEMENT OF CEMENT PLUGS
- ☒ The Balance Method
- ☐ The Dump Bailer Method
- ☐ The Two-Plug Method
- ☐ Other

CEMENTING TO PLUG AND ABANDON DATA:	PLUG #1	PLUG #2	PLUG #3	PLUG #4	PLUG #5	PLUG #6	PLUG #7
Size of Hole or Pipe in which Plug Will Be Placed (inches)	8 1/2	8.681	8.681	8.681			
Depth to Bottom of Tubing or Drill Pipe (ft.)	6270*	2143	1154	170			
Sacks of Cement To Be Used (each plug)	739	115	56	47			
Slurry Volume To Be Pumped (cu. ft.)	1198	18.7	90	77			
Calculated Top of Plug (ft.)	3738	1730	954	0			
Measured Top of Plug (if tagged ft.)							
Slurry Wt. (Lb./Gal.)	15.5	15.5	15.5	15.5			
Type Cement or Other Material (Class III)	Hawaiian + 40% silica flour						

LIST ALL OPEN HOLE AND/OR PERFORATED INTERVALS AND INTERVALS WHERE CASING WILL BE VARIED (if any)

From	To	From	To
3930	6791		

Estimated Cost to Plug Wells

$125,000 - $170,000 **

CERTIFICATION

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)

NAME AND OFFICIAL TITLE (Please type or print): MICHAEL KALEIKINI PLANT MGR

SIGNATURE: Michael Kaleikini

DATE SIGNED: 4/19/93

Form Approved OMB No. 2040-0042

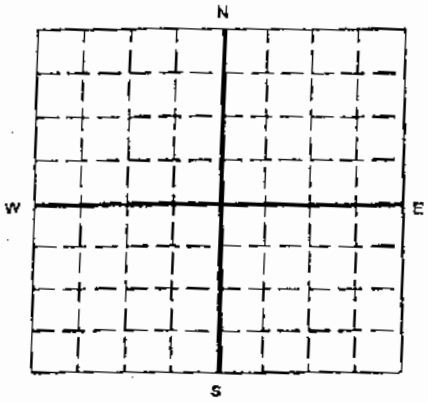
EPA

United States Environmental Protection Agency
Washington, DC 20460

PLUGGING AND ABANDONMENT PLAN

Name and Address of Facility	Name and Address of Owner/Operator
Puna Geothermal Venture 14-3860 Kapoho Pahoa Road Pahoa, HI 96778	Puna Geothermal Venture 14-3860 Kapoho Pahoa Road Pahoa, HI 96778

Locate Well and Outline Unit on Section Plat - 640 Acres



State	County	Permit Number
Hawaii	Hawaii	HI596002

Surface Location Description

____ 1/4 of ____ 1/4 of ____ 1/4 of ____ 1/4 of Section ____ Township ____ Range ____

Locate well in two directions from nearest lines of quarter section and drilling unit

8879.72 ft N. and 9601.32 ft E of Kaliu Benchmark

Surface Location ____ ft. frm (N/S) ____ Line of quarter section

and ____ ft. from (E/W) ____ Line of quarter section.

TYPE OF AUTHORIZATION

- [ ] Individual Permit
- [x] Area Permit
- [ ] Rule

Number of Wells ____

WELL ACTIVITY

- [ ] CLASS I
- [ ] CLASS II
  - [x] Brine Disposal
  - [ ] Enhanced Recovery
  - [ ] Hydrocarbon Storage
- [ ] CLASS III

Lease Name Kapoho State

Well Number KS-11

CASING AND TUBING RECORD AFTER PLUGGING

SIZE	WT (LB/FT)	TO BE PUT IN WELL (FT)	TO BE LEFT IN WELL (FT)	HOLE SIZE
22	106.5		0-1002	26
16	97		0-2102	20
11 3/4	65		0-5061	14 3/4
8 5/8	36		4250-7900	10 5/8

METHOD OF EMPLACEMENT OF CEMENT PLUGS

- [ ] The Balance Method
- [ ] The Dump Bailer Method
- [ ] The Two-Plug Method
- [ ] Other

CEMENTING TO PLUG AND ABANDON DATA:	PLUG #1	PLUG #2	PLUG #3	PLUG #4	PLUG #5	PLUG #6	PLUG #7
Size of Hole or Pipe in which Plug Will Be Placed (inche	10.625	10.9	10.9	10.9			
Depth to Bottom of Tubing or Drill Pipe (ft	5,900	2,200	1,100	175			
Sacks of Cement To Be Used (each plug)	5,900	115	115	100			
Slurry Volume To Be Pumped (cu. ft.)	7,000	136	136	120			
Calculated Top of Plug (ft.)	4,150	2,000	900	0			
Measured Top of Plug (if tagged ft.)							
Slurry Wt. (Lb./Gal.)							
Type Cement or Other Material (Class III)							

LIST ALL OPEN HOLE AND/OR PERFORATED INTERVALS AND INTERVALS WHERE CASING WILL BE VARIED (if any)

From	To	From	To
4,300	7,900		

Estimated Cost to Plug Wells

$170,000 - $200,000

Certification

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)

Name and Official Title (Please type or print)	Signature	Date Signed
MICHAEL L KALEIKINI PLANT MGR.	Michael L Kaleikini	4 MAR 83

EPA Form 7520-14